S Marvin & Associates
625.7042 Traffic safety
B15tsis improvement study
1992
V.2

CITY OF BOZEMAN

TRAFFIC SAFETY IMPROVEMENT STUDY

STATE DOCUMENTS COLLECTION
DEC 1 1992
MONTANA STATE LIBRARY
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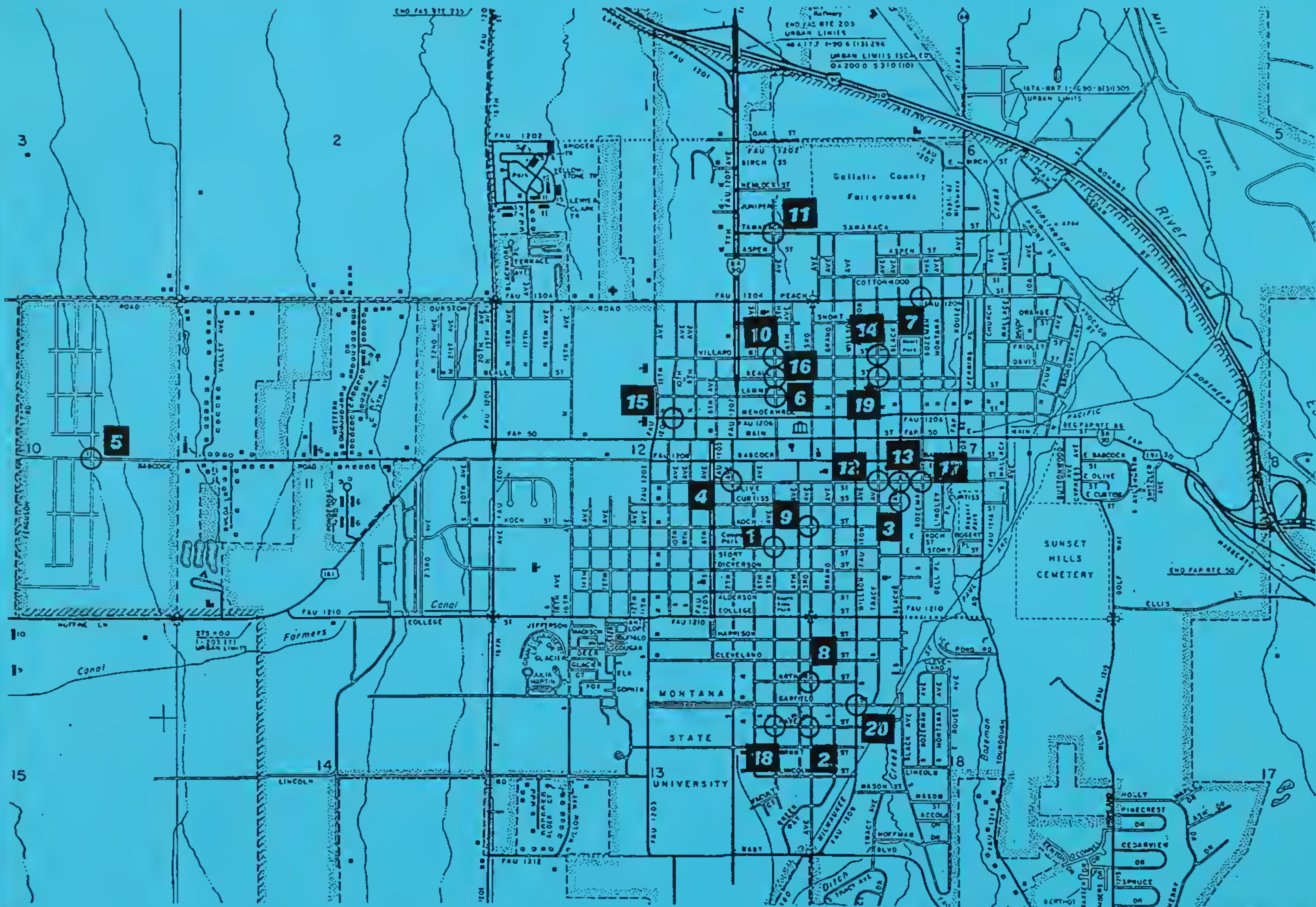
HELENA, MONTANA 59620



LOCATION MAP

PLEASE RETURN

SHEET INDEX

	DESCRIPTION		SHEET NUMBERS	
PLAN LEGEND			1	
SIGNING & PAVEMENT MARKING KEY			2	
PLAN SHEETS BY PRIORITY:			EXISTING CONDITION	SHORT TERM IMPROVEMENT
1	STORY	FIFTH	3	4
2	HAYES	THIRD	5	6
3	CURTISS	TRACY	7	8
4	OLIVE	SEVENTH	9	10
5	BABCOCK	YELLOWSTONE	11	12
6	LAMME	FIFTH	13	14
7	PEACH	BOZEMAN	15	16
8	ARTHUR	THIRD	17	18
9	KOCH	THIRD	19	20
10	VILLARD	FIFTH	21	22
11	TAMARACK	FIFTH	23	24
12	OLIVE	TRACY	25	26
13	OLIVE	BLACK	27	28
14	VILLARD	TRACY	29	30
15	MENDENHALL	TENTH	31	32
16	BEALL	FIFTH	33	34
17	OLIVE	BOZEMAN	35	36
18	HAYES	FIFTH	37	38
19	BEALL	TRACY	39	40
20	GARFIELD	WILLSON	41	42

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Billings, MT 59102

EXISTING CONDITIONS & SHORT TERM IMPROVEMENTS

VOLUME II - PLAN SHEETS

MONTANA STATE LIBRARY
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Traffic safety improvement study /
3 0864 00081545 9

LEGEND

YELOW PAINTED CURB

WOODEN FENCE

METAL FENCE

BARBED WIRE FENCE

ROCK WALL

BUILDING

LAMP POST

SIGN POST

POWER POLE

BUSH

ELM TREE

SPRUCE TREE

BIRCH TREE

CEDER TREE

MAPLE TREE

PINE TREE

BIRCH TREE

ASPEN TREE

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EXISTING CONDITION &
SHORT TERM IMPROVEMENTS

LEGEND TO DRAWINGS

SHEET 1

R1-1
30"X30"
(Unless Otherwise Noted)

R1-2
36"x36"x36"

R7-3ar
12"x18"

R7-3al
12"x18"

R7-1l
12"x18"

R7-1
12"x18"

R7-1r
12"x18"

R6-1r
36"x12"

R6-1l
36"x12"

R3-7r
30"x30"

R3-1l
24"x24"

R3-1r
24"x24"

R3-5l
30"x36"

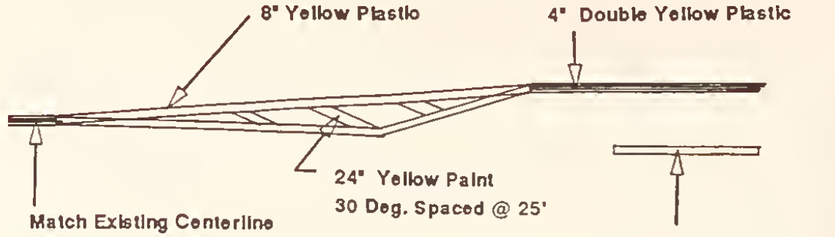
R3-9b
24"x38"

R4-7
24"x30"

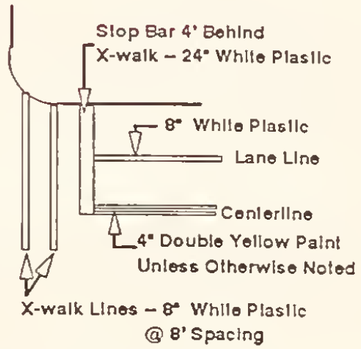
W11
30"x30"

W11A-2
30"x30"

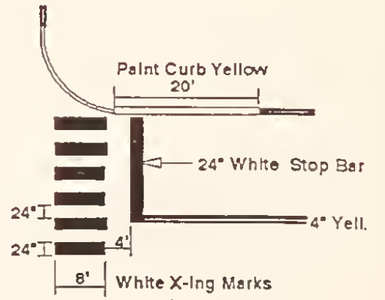
W3-1a
30"x30"



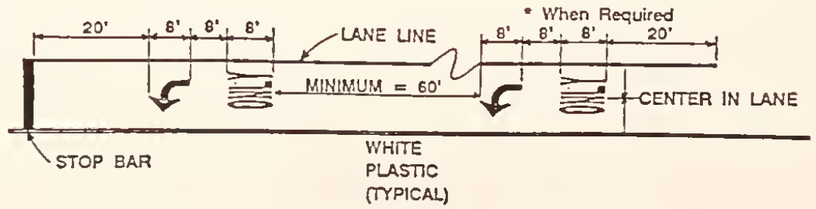
TYPICAL CENTER DIVIDER ISLAND MARKS



TYPICAL INTERSECTION MARKS



TYPICAL SCHOOL X-ING MARKINGS



TYPICAL WORDS & SYMBOLS LAYOUT

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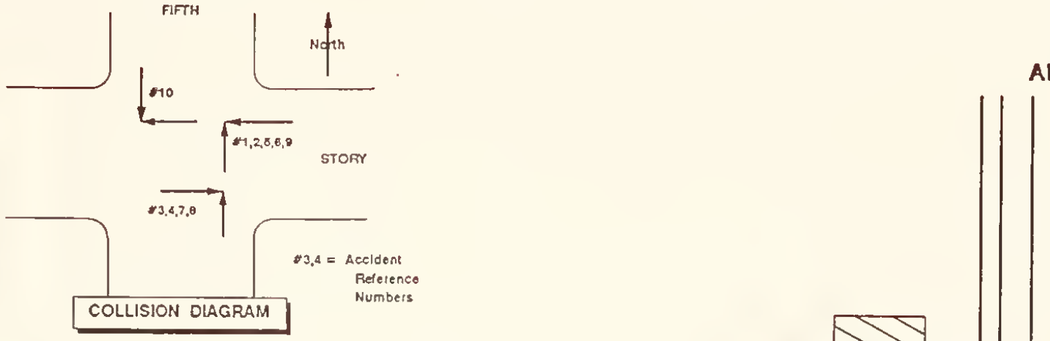
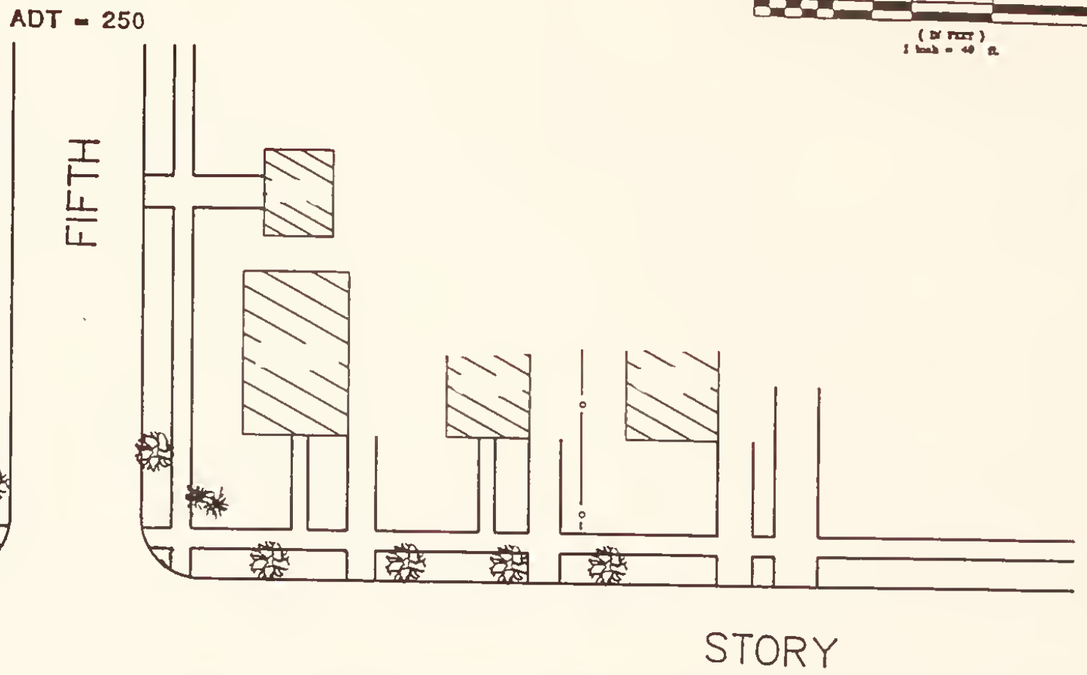
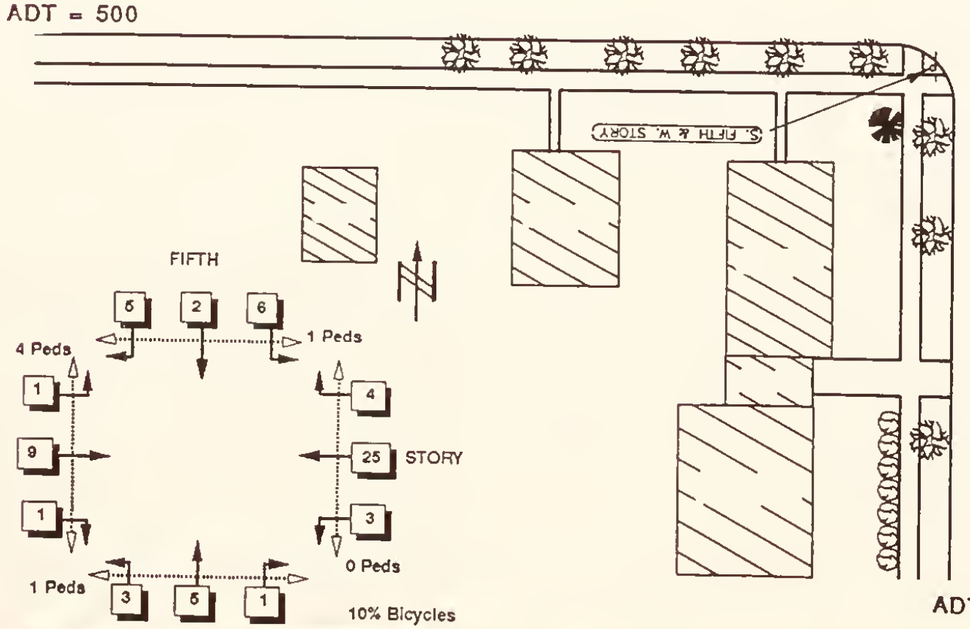
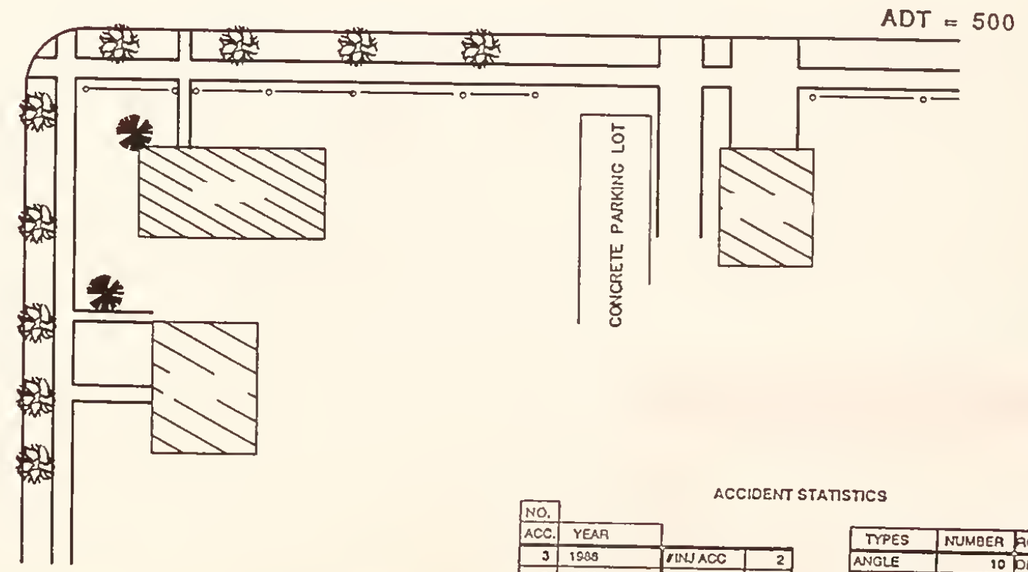
SHORT TERM IMPROVEMENTS

SIGNING & PAVEMENT MARKING KEY









TRAFFIC MOVEMENTS 2:00 - 3:00 PM 7/24/92

ACCIDENT STATISTICS

NO. ACC.	YEAR		
3	1988	#INJ ACC	2
2	1989	#FAT ACC	0
2	1990	#PDO ACC	6
3	1991	PERSON =	4
10	TOTAL	NIGHTIME	10%

TYPES	NUMBER	ROAD	
ANGLE	10	DRY	40%
REAR END	0	WET	10%
SIDESWIPE	0	SNOW	30%
LEFT TRN	0	ICE	20%
OTHER	0	OTHER	0%

* No. of Persons Injured

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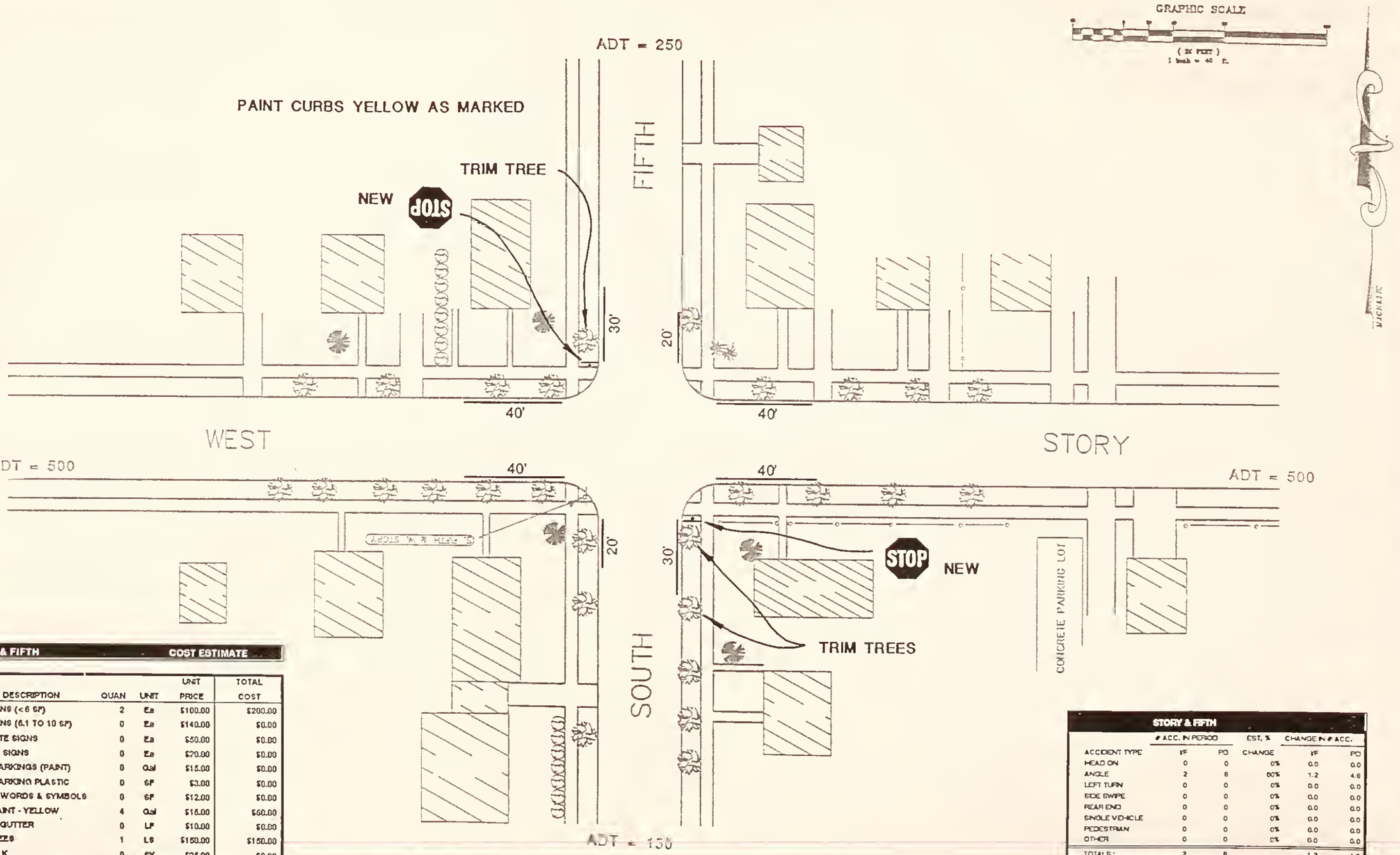
STORY & FIFTH

EXISTING CONDITIONS

SHEET 3



STORY & FIFTH — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	2	Ea	$100.00	$200.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	4	Gal	$15.00	$60.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$150.00	$150.00
11	SIDEWALK	0	SY	$25.00	$0.00
12	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$410.00

STORY & FIFTH

ACCIDENT TYPE	# ACC. IN PERIOD IF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. IF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	2	8	60%	1.2	4.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	2	8		1.2	4.8

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

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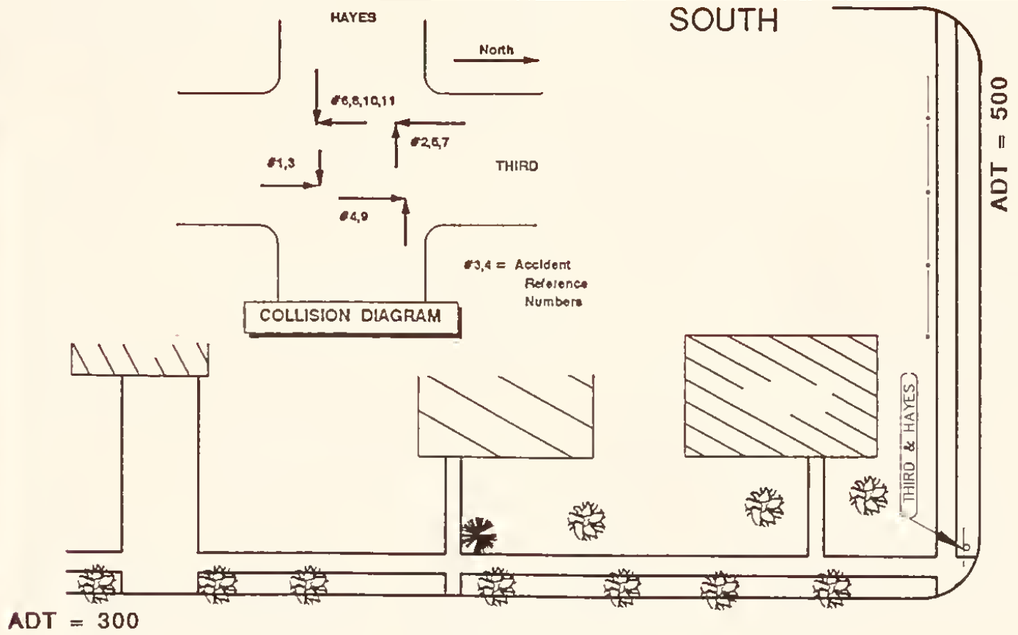
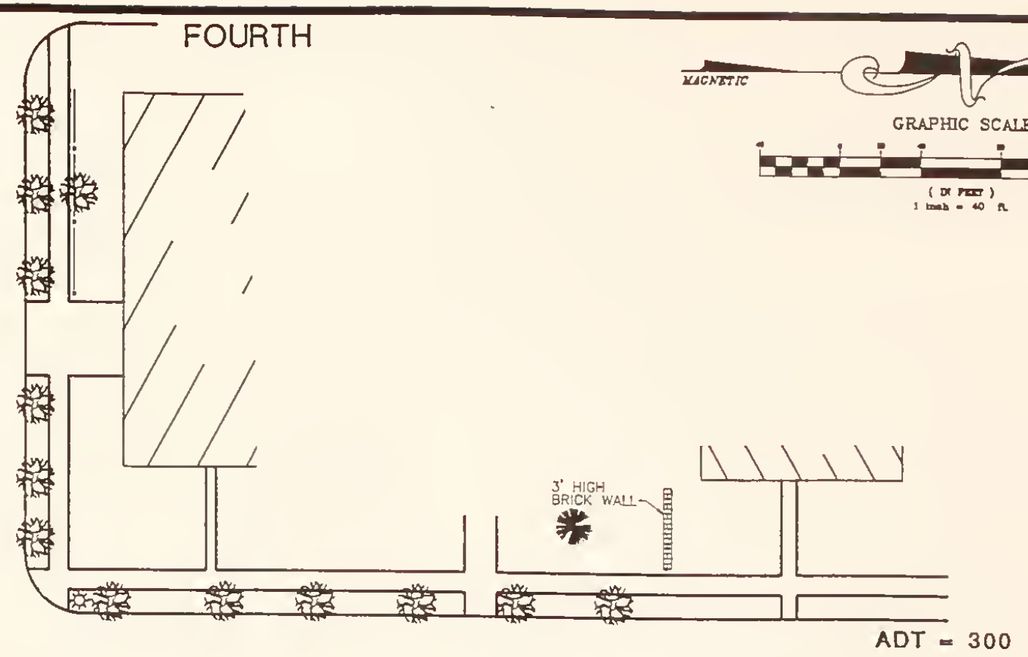
STORY & FIFTH

SHORT TERM IMPROVEMENTS

SHEET 4

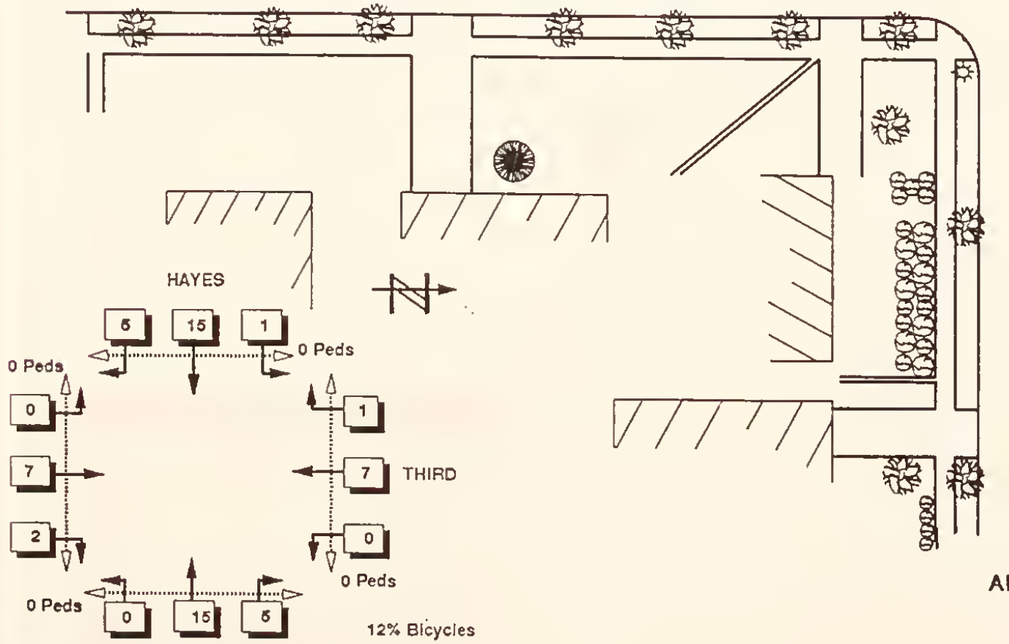


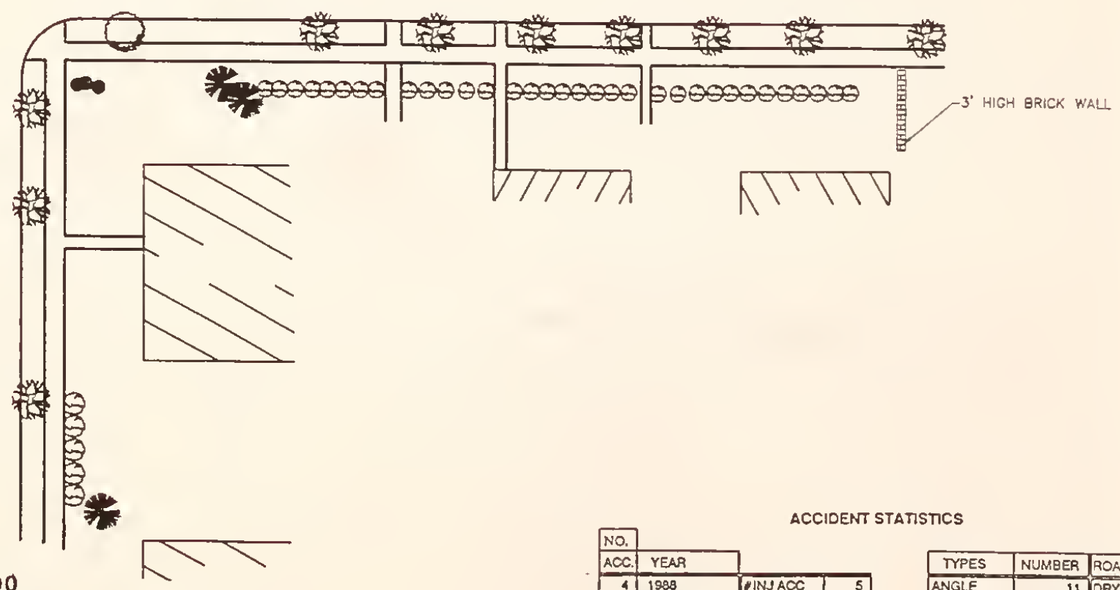


HAYES

SOUTH

THIRD





TRAFFIC MOVEMENTS 2:00 - 3:00 PM 9/10/92

ACCIDENT STATISTICS

NO. ACC.	YEAR		
4	1988	#INJ ACC	5
2	1989	#FAT ACC	0
3	1990	#PDO ACC	6
2	1991	PERSON =	6 *
11	TOTAL	NIGHTIME	9%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	11	DRY	91%
REAR END	0	WET	9%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	0%
OTHER	0	OTHER	0%

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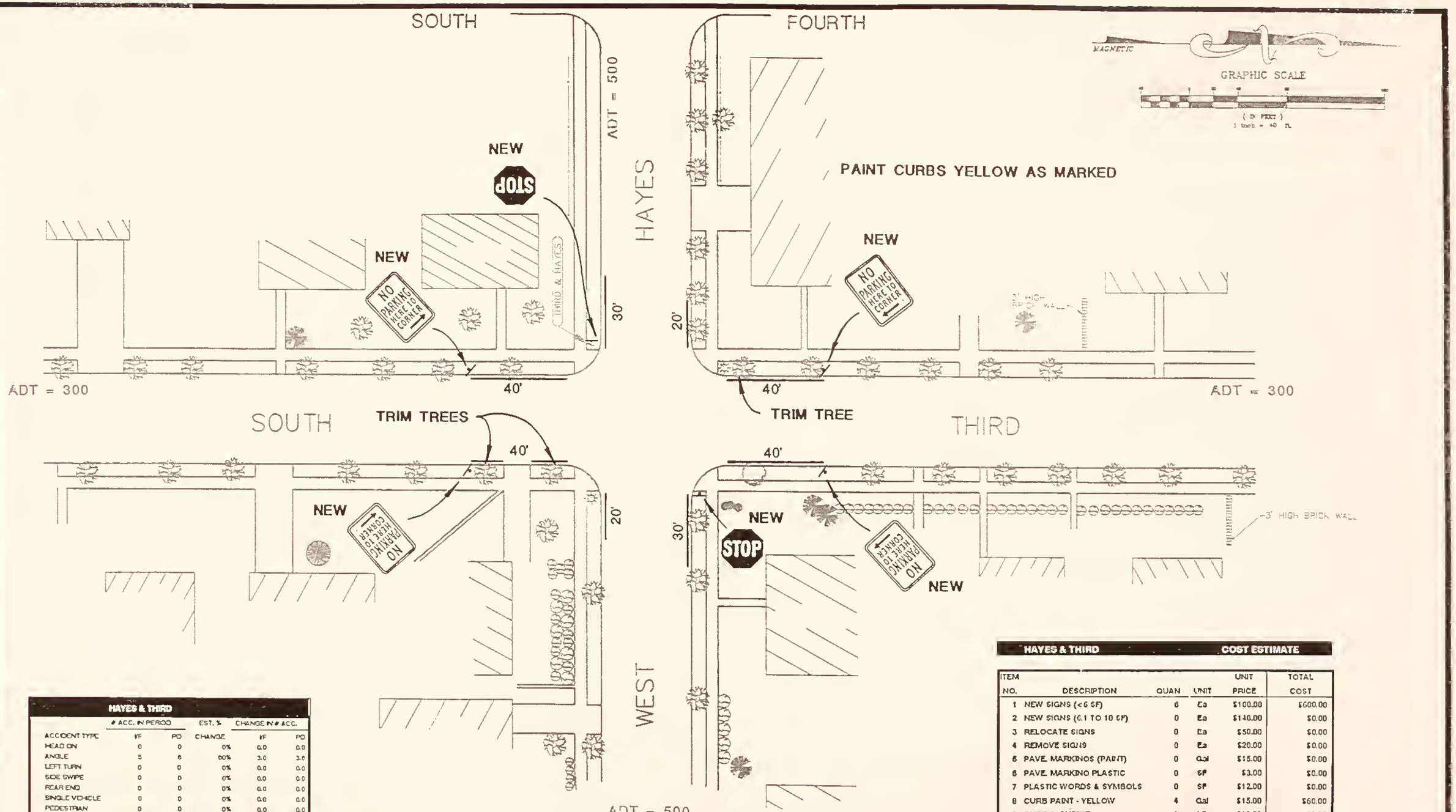
HAYES & THIRD

EXISTING CONDITIONS

SHEET 5



HAYES & THIRD

ACCIDENT TYPE	# ACC. IN PERIOD I/F	# ACC. IN PERIOD P/D	EST. % CHANGE	CHANGE IN # ACC. I/F	CHANGE IN # ACC. P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	5	6	60%	3.0	3.6
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS :	5	6		3.0	3.6

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

HAYES & THIRD — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	6	Ea	$100.00	$600.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	4	Gal	$15.00	$60.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$100.00	$100.00
11	SIDEWALK	0	SY	$25.00	$0.00
TOTAL CONSTRUCTION COSTS =					$760.00

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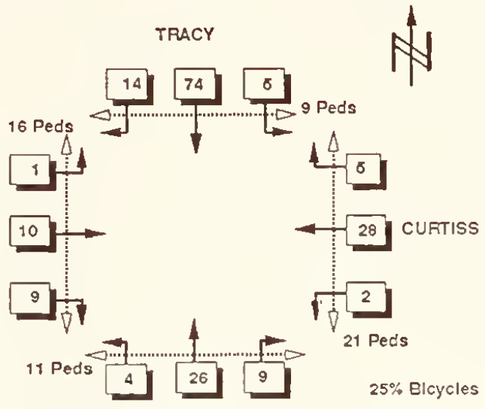
HAYES & THIRD

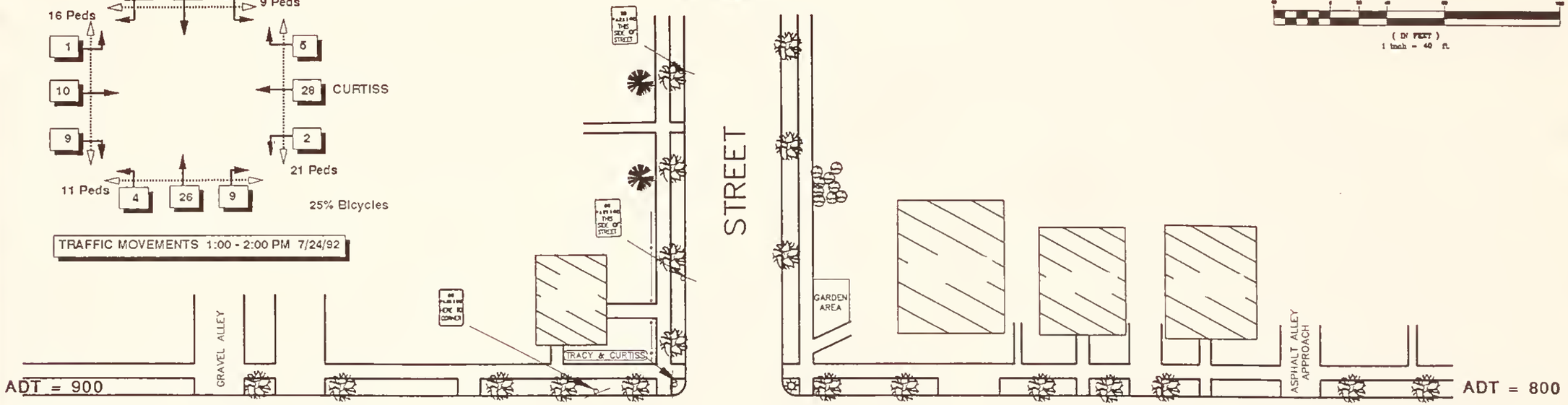
SHORT TERM IMPROVEMENTS

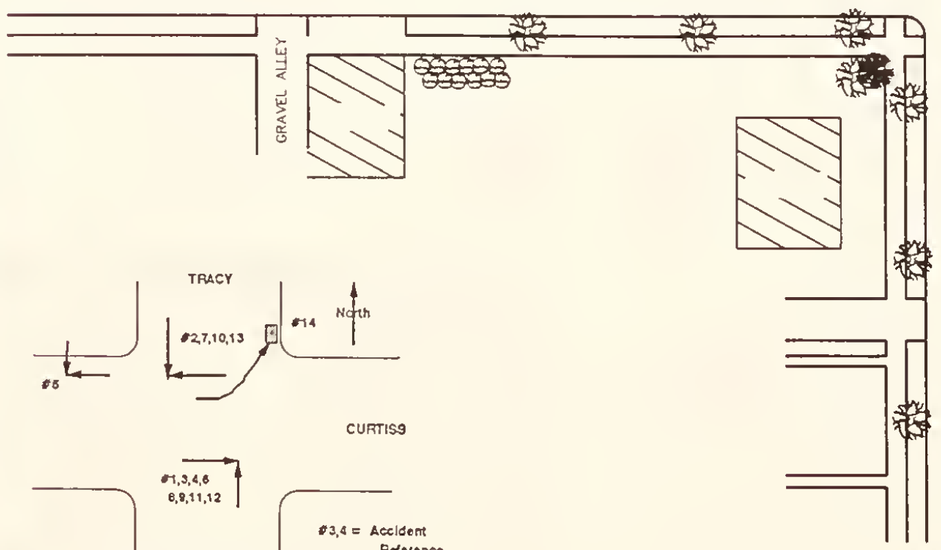
SHEET 6



TRAFFIC MOVEMENTS 1:00 - 2:00 PM 7/24/92

ADT = 1600





ACCIDENT STATISTICS

NO. ACC.	YEAR		
3	1988	#INJ ACC	6
4	1989	#FAT ACC	0
3	1990	#PDO ACC	6
4	1991	PERSON =	10 *
14	TOTAL	NIGHTIME	21%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	13	DRY	57%
REAR END	0	WET	7%
SIDESWIPE	0	SNOW	7%
LEFT TRN	0	ICE	29%
OTHER	1	OTHER	0%

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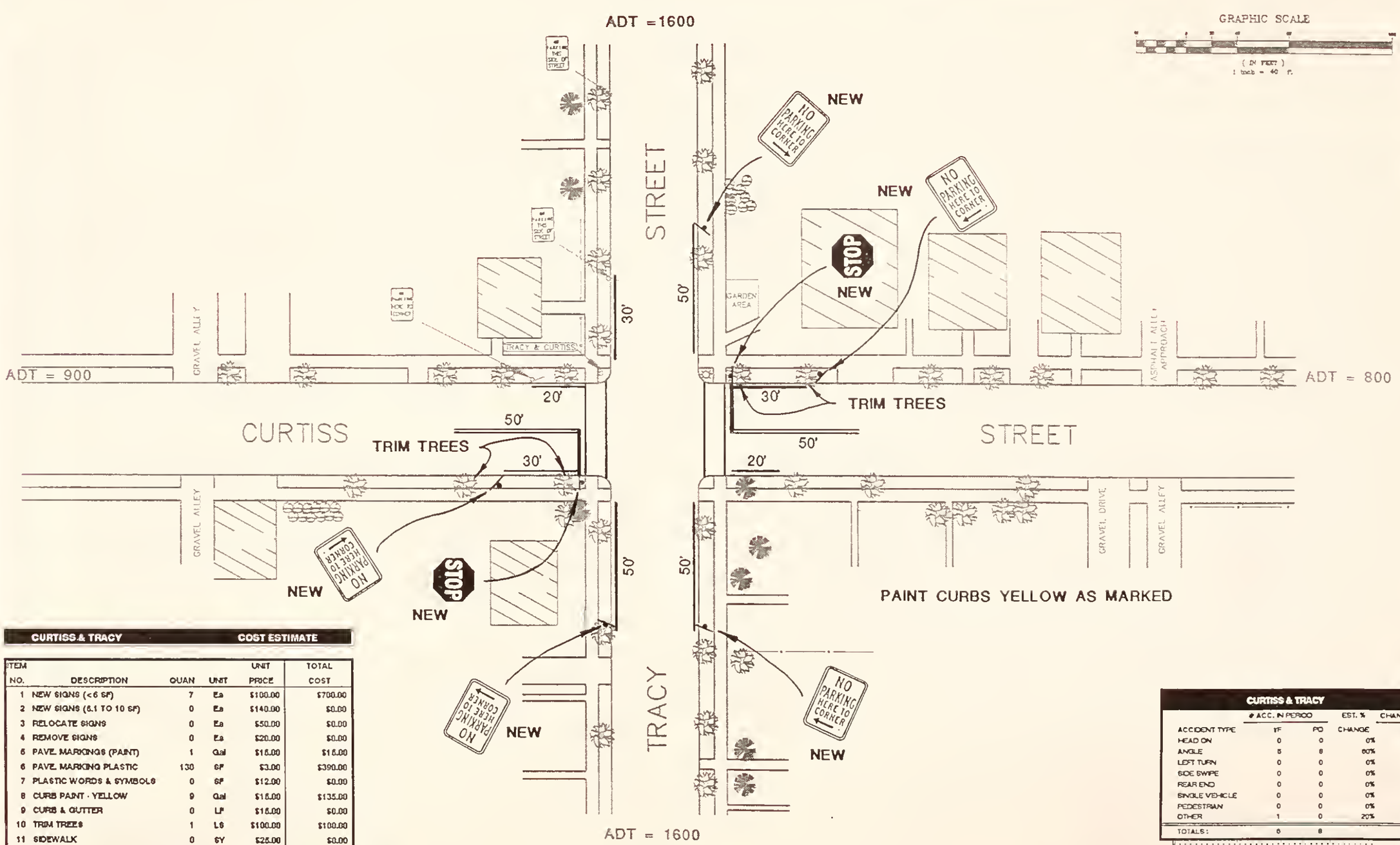
CURTISS & TRACY

EXISTING CONDITIONS

SHEET 7



CURTISS & TRACY — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	7	Ea	$100.00	$700.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	130	SF	$3.00	$390.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	9	Gal	$15.00	$135.00
9	CURB & GUTTER	0	LF	$15.00	$0.00
10	TRIM TREES	1	LS	$100.00	$100.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,340.00

CURTISS & TRACY

ACCIDENT TYPE	# ACC. IN PERIOD IF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. IF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	5	8	60%	3.0	4.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	1	0	20%	0.2	0.0
TOTALS:	6	8		3.2	4.8

% REDUCTION IN INJURY/FATAL ACCIDENTS = 53.3%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

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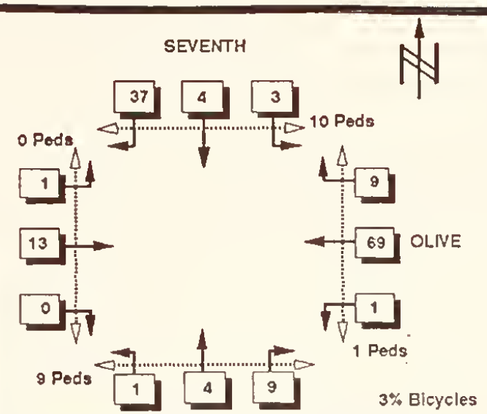
CURTISS & TRACY

SHORT TERM IMPROVEMENTS

SHEET 8



TRAFFIC MOVEMENTS 1:00 - 2:00 PM 7/24/92

ADT = 800

SEVENTH

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

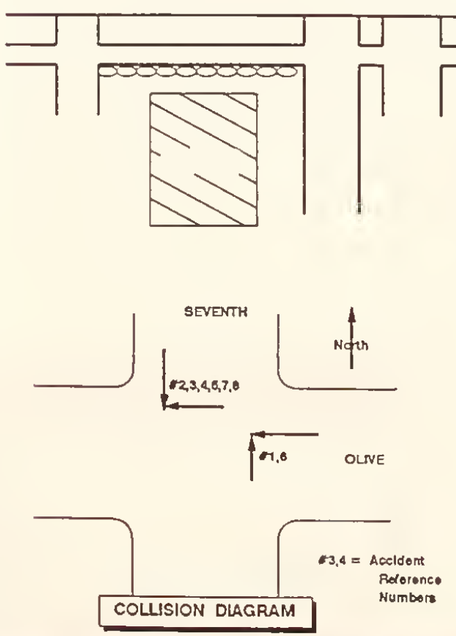
MAGNETIC

ADT = 1600

ADT = 1400

WEST

OLIVE



COLLISION DIAGRAM

SOUTH

ADT = 250

ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	4
4	1989	#FAT ACC	0
0	1990	#PDO ACC	4
2	1991	PERSON =	5 *
8	TOTAL	NIGHTIME	13%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	8	DRY	63%
REAR END	0	WET	13%
SIDESWIPE	0	SNOW	13%
LEFT TRN	0	ICE	13%
OTHER	0	OTHER	0%

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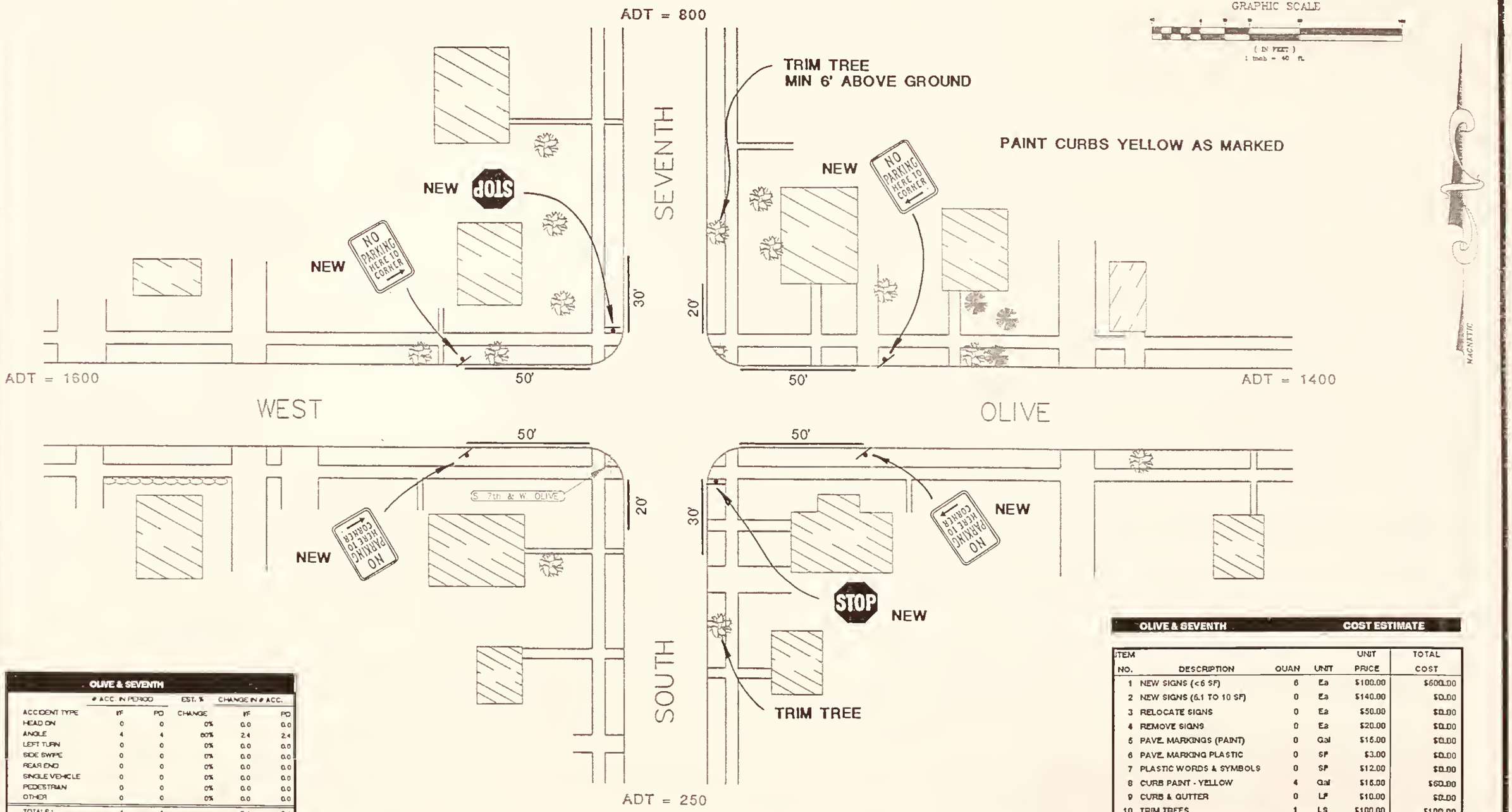
OLIVE & SEVENTH

EXISTING CONDITIONS

SHEET 9



OLIVE & SEVENTH

ACCIDENT TYPE	# ACC. IN PERIOD I/F	# ACC. IN PERIOD P/D	EST. % CHANGE	CHANGE IN # ACC. I/F	CHANGE IN # ACC. P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	4	4	60%	2.4	2.4
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	4	4		2.4	2.4

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

OLIVE & SEVENTH — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	6	Ea	$100.00	$600.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	4	Gal	$15.00	$60.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$100.00	$100.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$760.00

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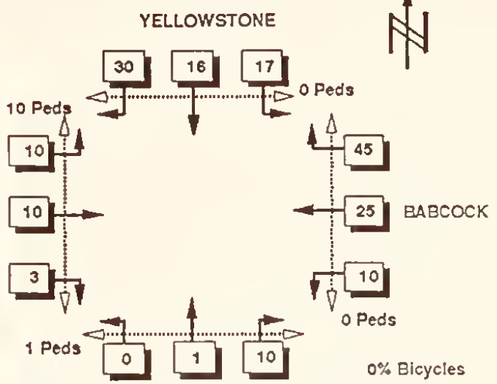
OLIVE & SEVENTH

SHORT TERM IMPROVEMENTS

SHEET 10



TRAFFIC MOVEMENTS 3:00 - 4:00 PM 9/10/92

ADT = 1700

EMPTY LOT

YELLOWSTONE

EMPTY LOT

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

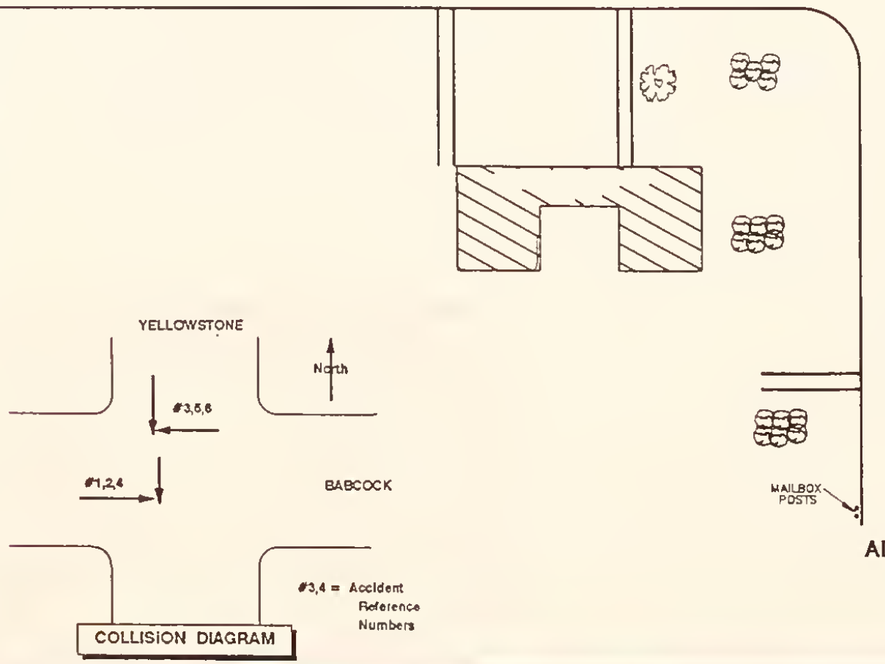
MAGNETIC

ADT = 1100

ADT = 1700

WEST

BABCOCK



COLLISION DIAGRAM

SOUTH

ADT = 600

W. BABCOCK & S. YELLOWSTONE

EMPTY LOT

ACCIDENT STATISTICS

NO. ACC.	YEAR		
0	1988	#INJ ACC	4
2	1989	#FAT ACC	0
2	1990	#PDO ACC	2
2	1991	PERSON =	6 *
6	TOTAL	NIGHTIME	33%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	6	DRY	50%
REAR END	0	WET	17%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	33%
OTHER	0	OTHER	0%

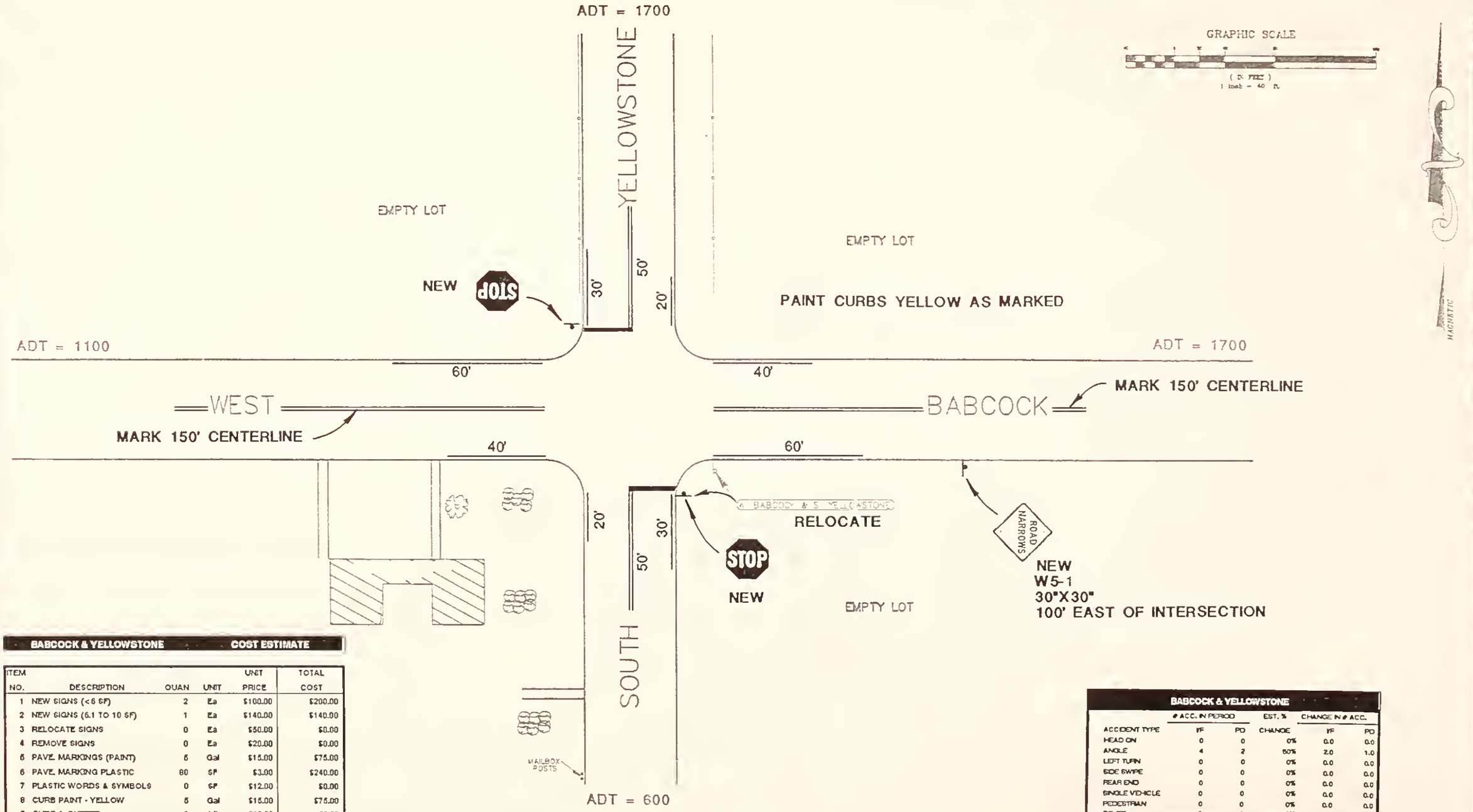
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers

1127 Alderson Ave. #204
Billings, MT 59102

BABCOCK & YELLOWSTONE

EXISTING CONDITIONS

SHEET 11



BABCOCK & YELLOWSTONE — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	2	Ea	$100.00	$200.00
2	NEW SIGNS (6.1 TO 10 SF)	1	Ea	$140.00	$140.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	5	Gal	$15.00	$75.00
6	PAVE. MARKING PLASTIC	80	SF	$3.00	$240.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	5	Gal	$15.00	$75.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	LS	$50.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$730.00

BABCOCK & YELLOWSTONE

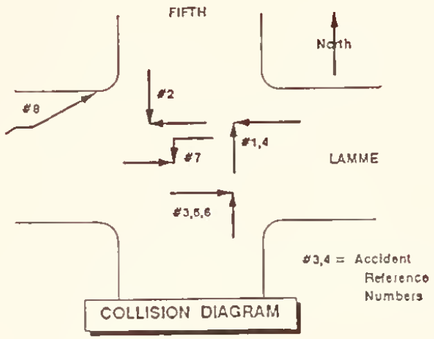
ACCIDENT TYPE	# ACC. IN PERIOD FF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. FF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	4	2	50%	2.0	1.0
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	4	2		2.0	1.0
% REDUCTION IN INJURY/FATAL ACCIDENTS =				50.0%	
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS =					50.0%

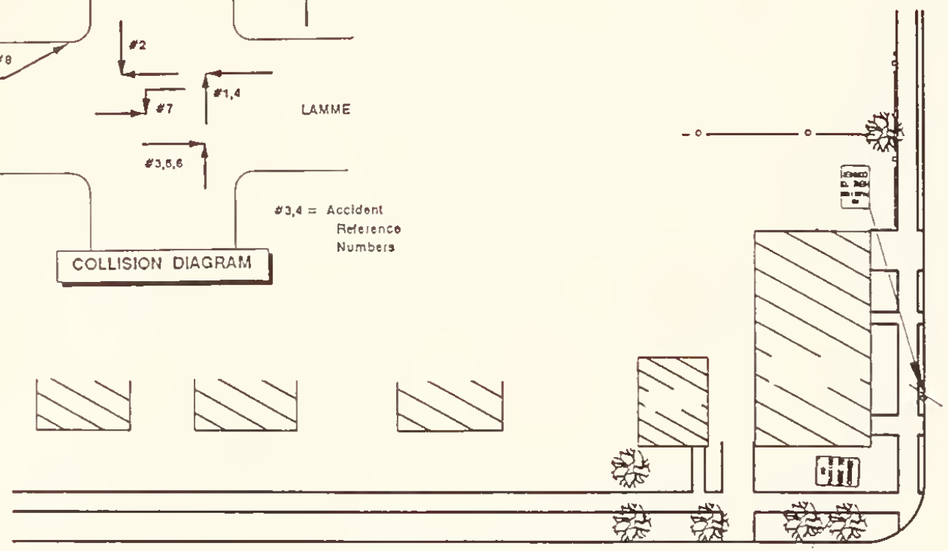
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

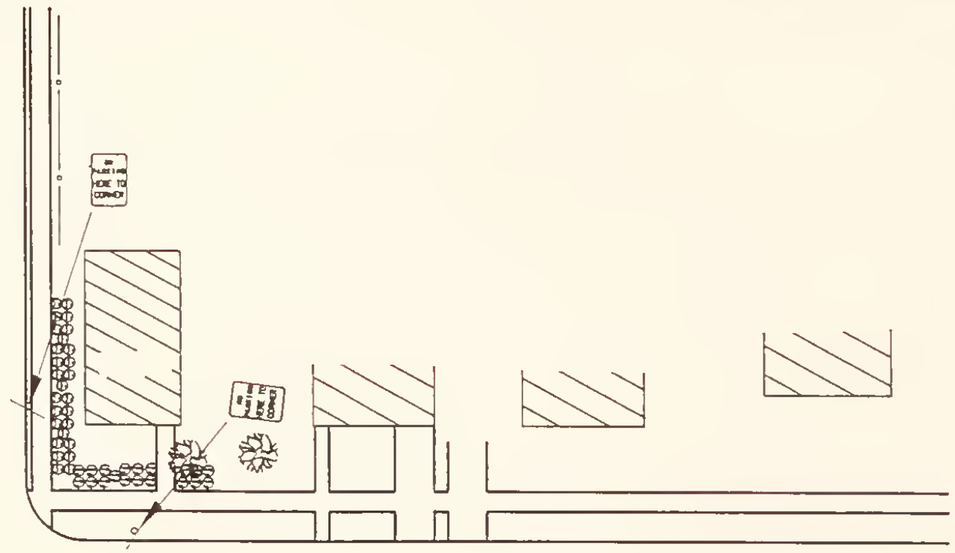
BABCOCK & YELLOWSTONE

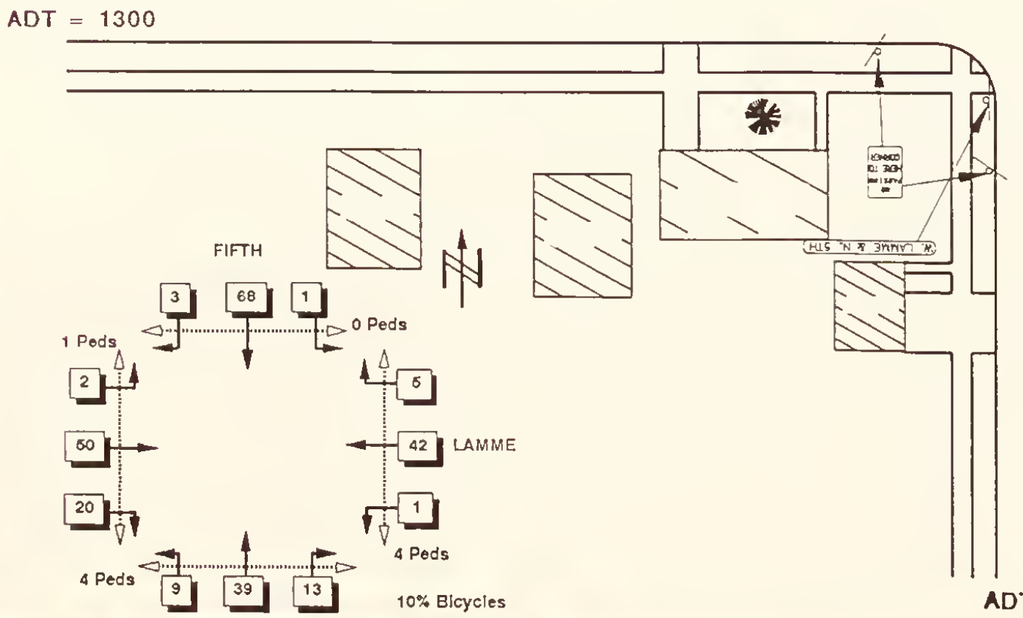
SHORT TERM IMPROVEMENTS

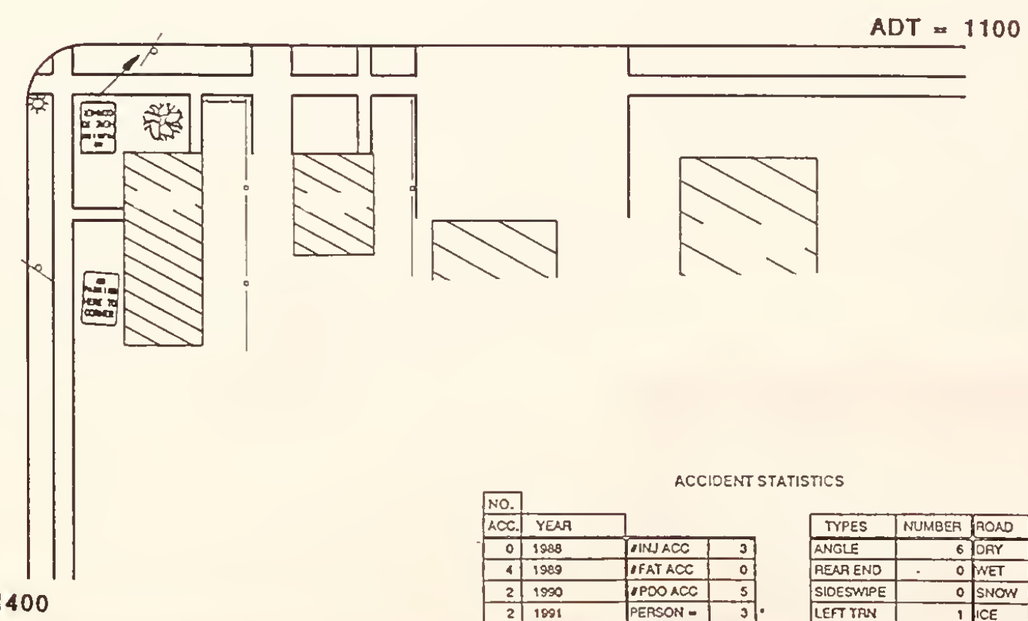
SHEET 12











ACCIDENT STATISTICS

NO. ACC.	YEAR		
0	1988	#INJ ACC	3
4	1989	#FAT ACC	0
2	1990	#PDO ACC	5
2	1991	PERSON =	3 *
8	TOTAL	NIGHTIME	13%

TYPES	NUMBER	ROAD	
ANGLE	6	DRY	88%
REAR END	0	WET	0%
SIDESWIPE	0	SNOW	0%
LEFT TRN	1	ICE	13%
OTHER	1	OTHER	0%

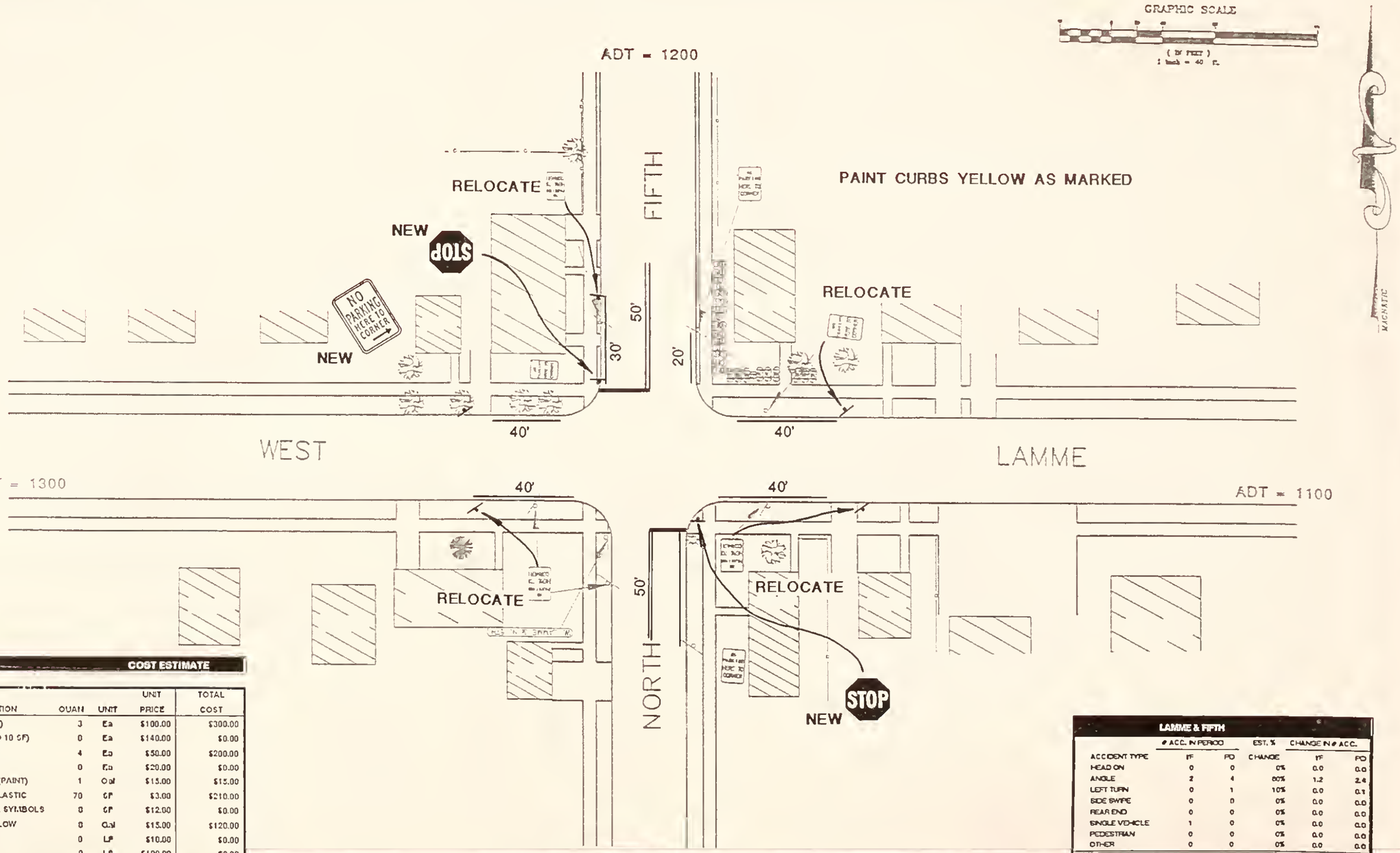
* No. of Persons Injured

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

LAMME & FIFTH

EXISTING CONDITIONS

SHEET 13



LAMME & FIFTH — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	3	Ea	$100.00	$300.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	4	Ea	$50.00	$200.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	1	Cal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	70	SF	$3.00	$210.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	8	Cal	$15.00	$120.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	LS	$100.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				6845.00

LAMME & FIFTH

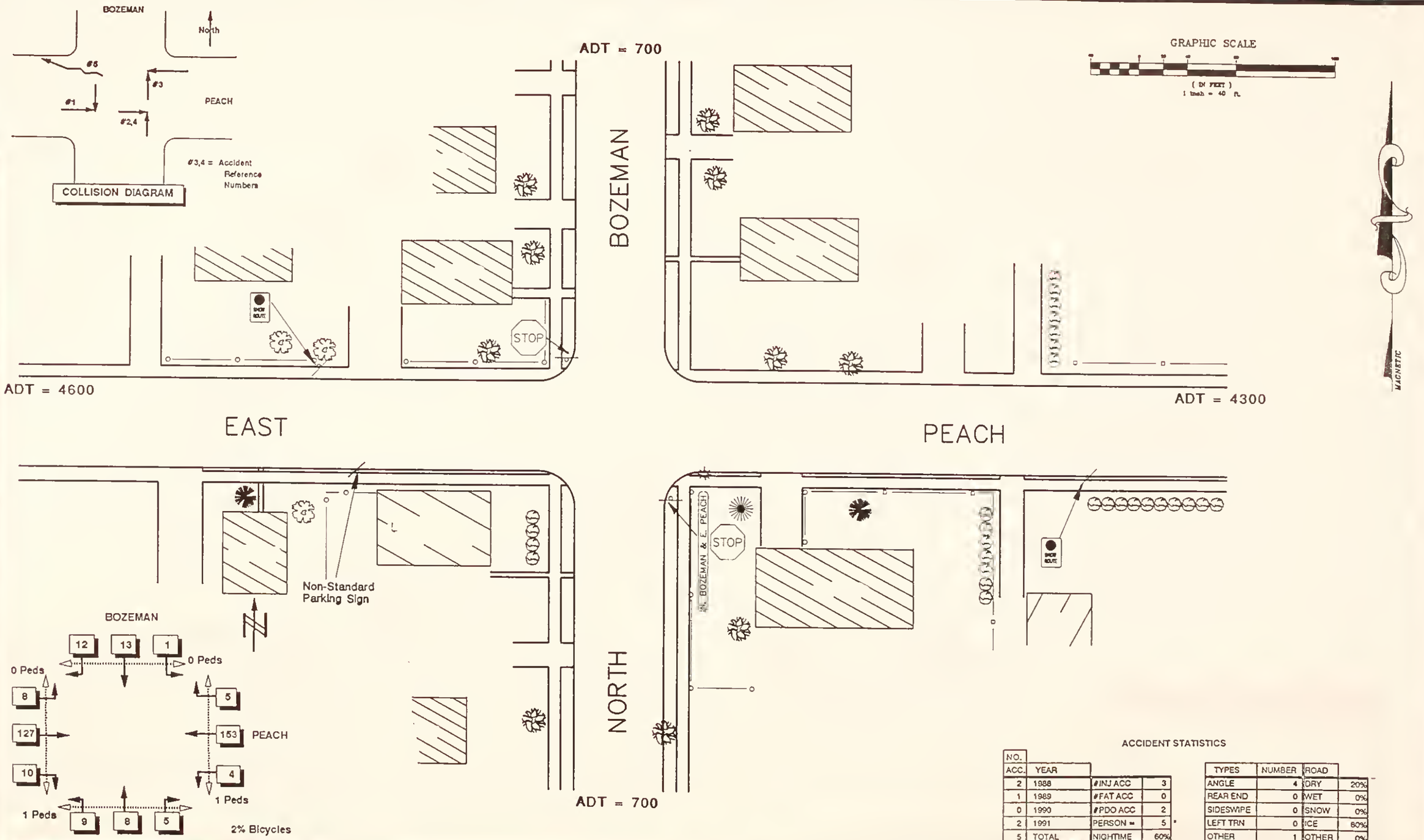
ACCIDENT TYPE	# ACC. IN PERIOD IF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. IF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	2	4	60%	1.2	2.4
LEFT TURN	0	1	10%	0.0	0.1
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	1	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	3	6		1.2	2.5
% REDUCTION IN INJURY/FATAL ACCIDENTS =				40.0%	
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS =					50.0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

LAMME & FIFTH

SHORT TERM IMPROVEMENTS

SHEET 14



ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	3
1	1989	#FAT ACC	0
0	1990	#PDO ACC	2
2	1991	PERSON =	5
5	TOTAL	NIGHTIME	60%

TYPES	NUMBER	ROAD	
ANGLE	4	DRY	20%
REAR END	0	WET	0%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	80%
OTHER	1	OTHER	0%

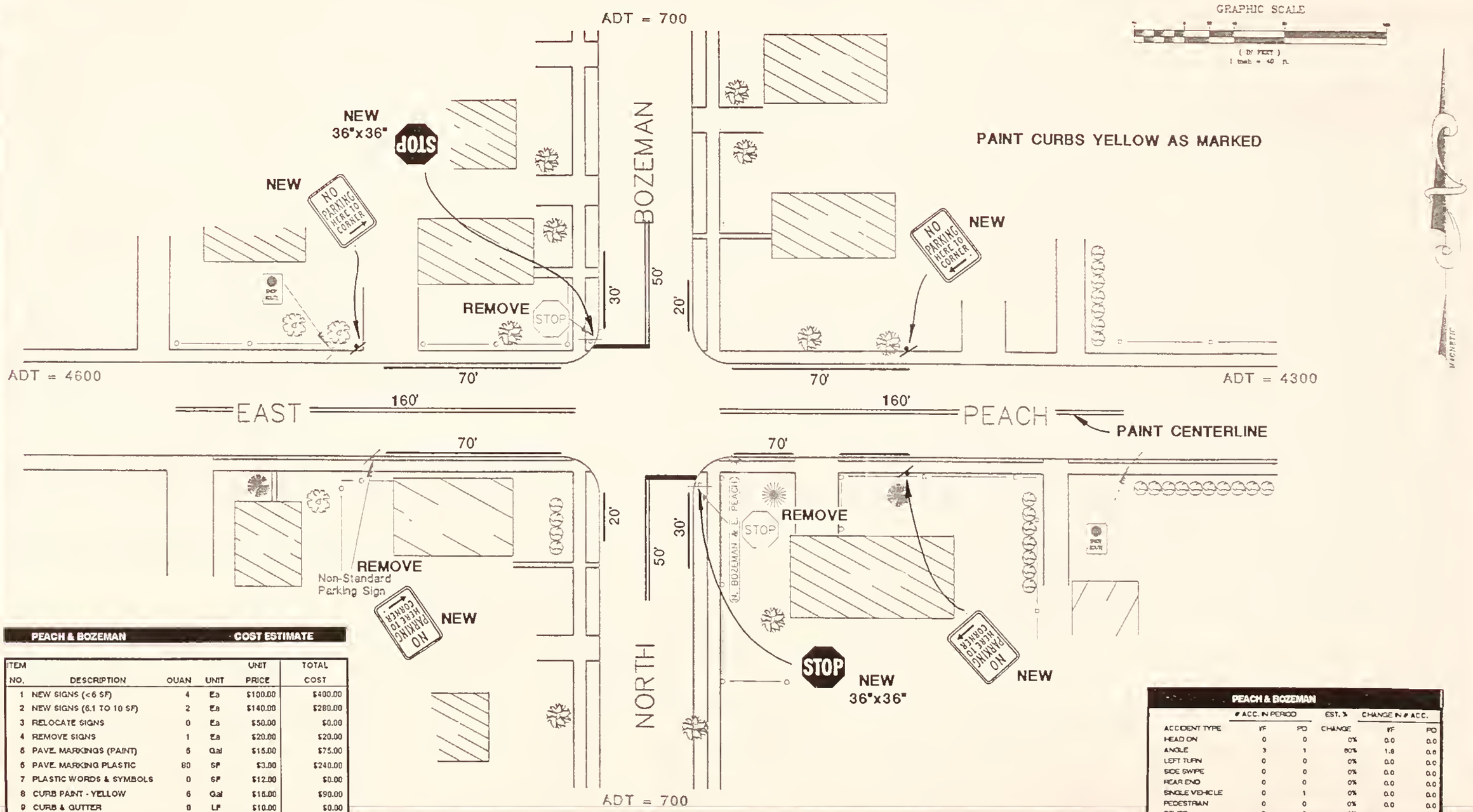
TRAFFIC MOVEMENTS 10:00 - 11:00 AM 7/24/92

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

PEACH & BOZEMAN

EXISTING CONDITIONS

SHEET 15



PEACH & BOZEMAN — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	4	Ea	$100.00	$400.00
2	NEW SIGNS (6.1 TO 10 SF)	2	Ea	$140.00	$280.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	1	Ea	$20.00	$20.00
5	PAVE. MARKINGS (PAINT)	5	Gal	$15.00	$75.00
6	PAVE. MARKING PLASTIC	80	SF	$3.00	$240.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	6	Gal	$15.00	$90.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	Ea	$100.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
12	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,105.00

PEACH & BOZEMAN

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	I/F	P/D		I/F	P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	3	1	60%	1.8	0.6
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	1	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	3	2		1.8	0.6

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

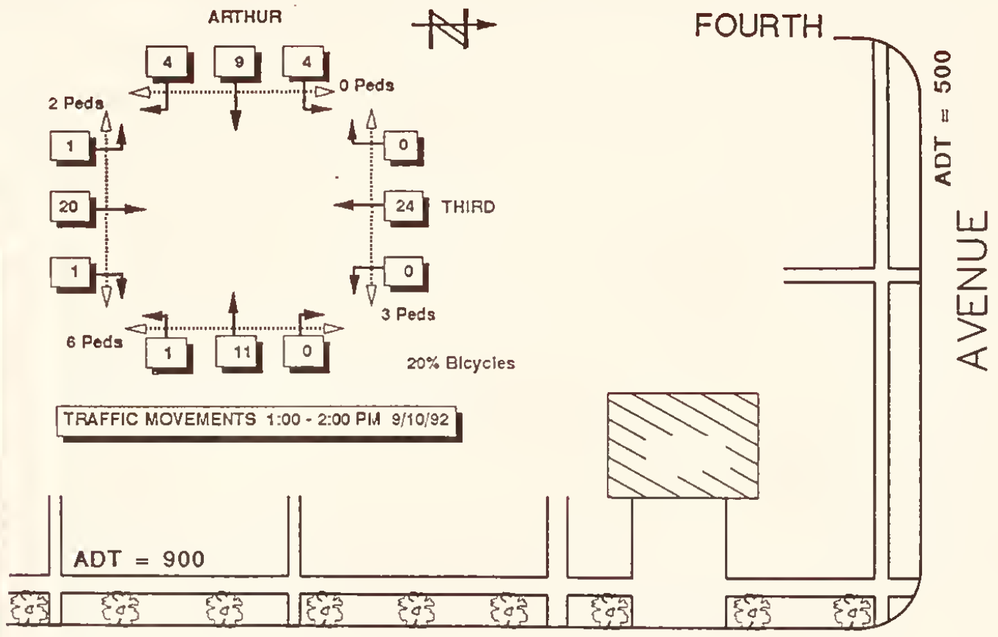
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 30.0%

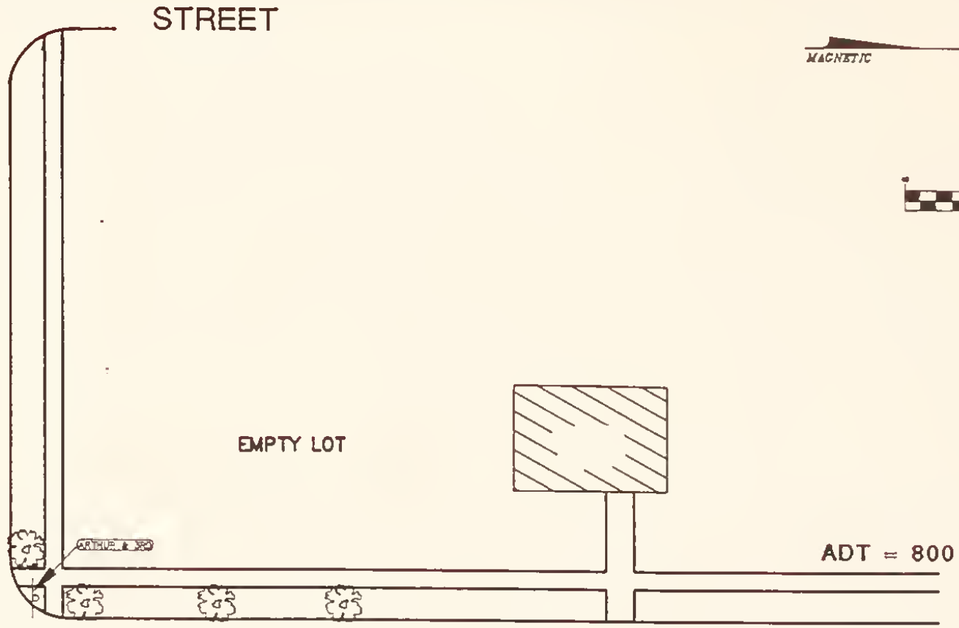
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

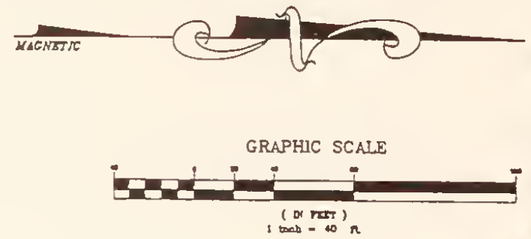
PEACH & BOZEMAN

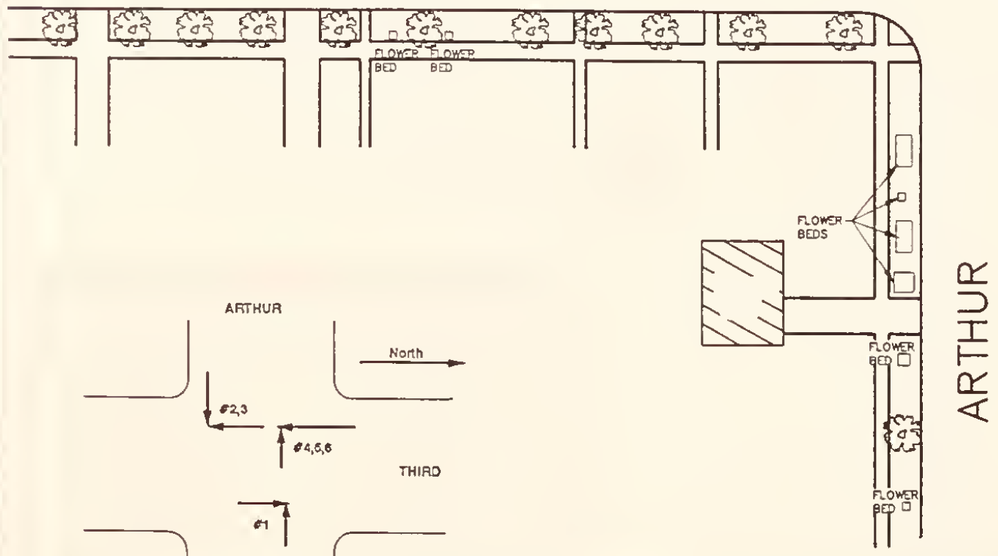
SHORT TERM IMPROVEMENTS

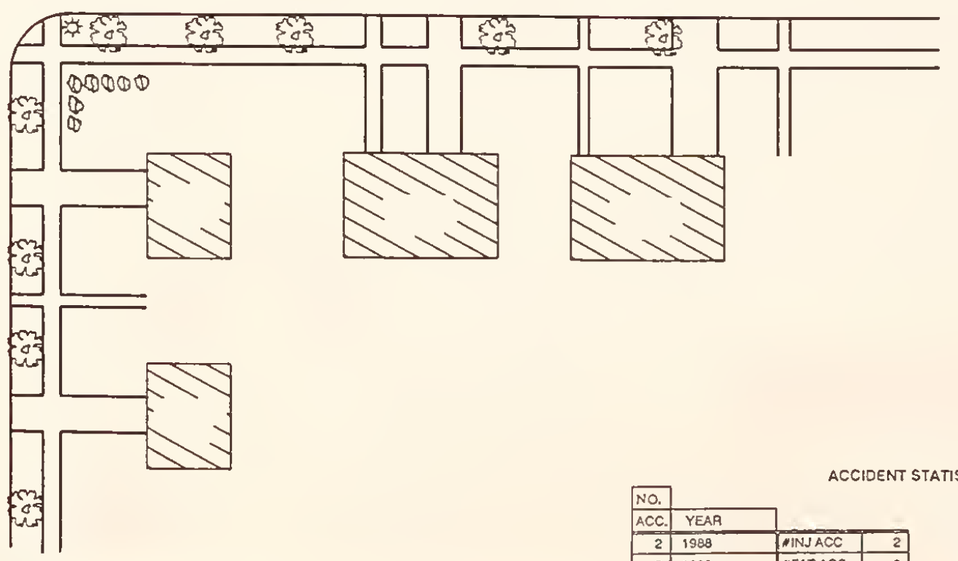
SHEET 16

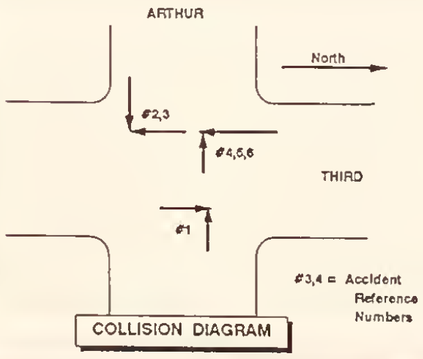












ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	2
2	1989	#FAT ACC	0
1	1990	#PDO ACC	4
1	1991	PERSON =	2 *
6	TOTAL	NIGHTIME	17%

TYPES	NUMBER	ROAD	
ANGLE	6	DRY	67%
REAR END	0	WET	17%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	17%
OTHER	0	OTHER	0%

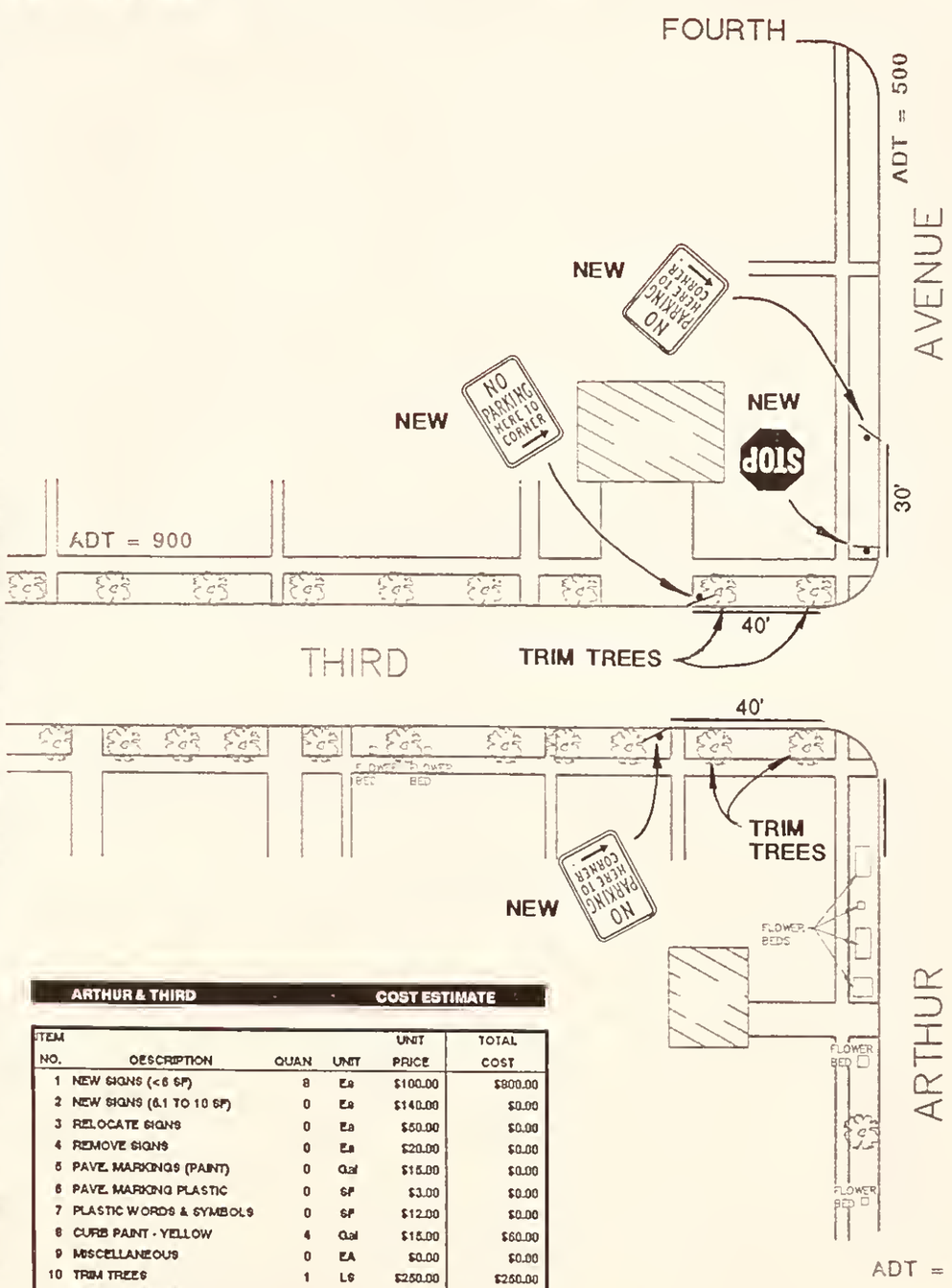
* No. of Persons Injured

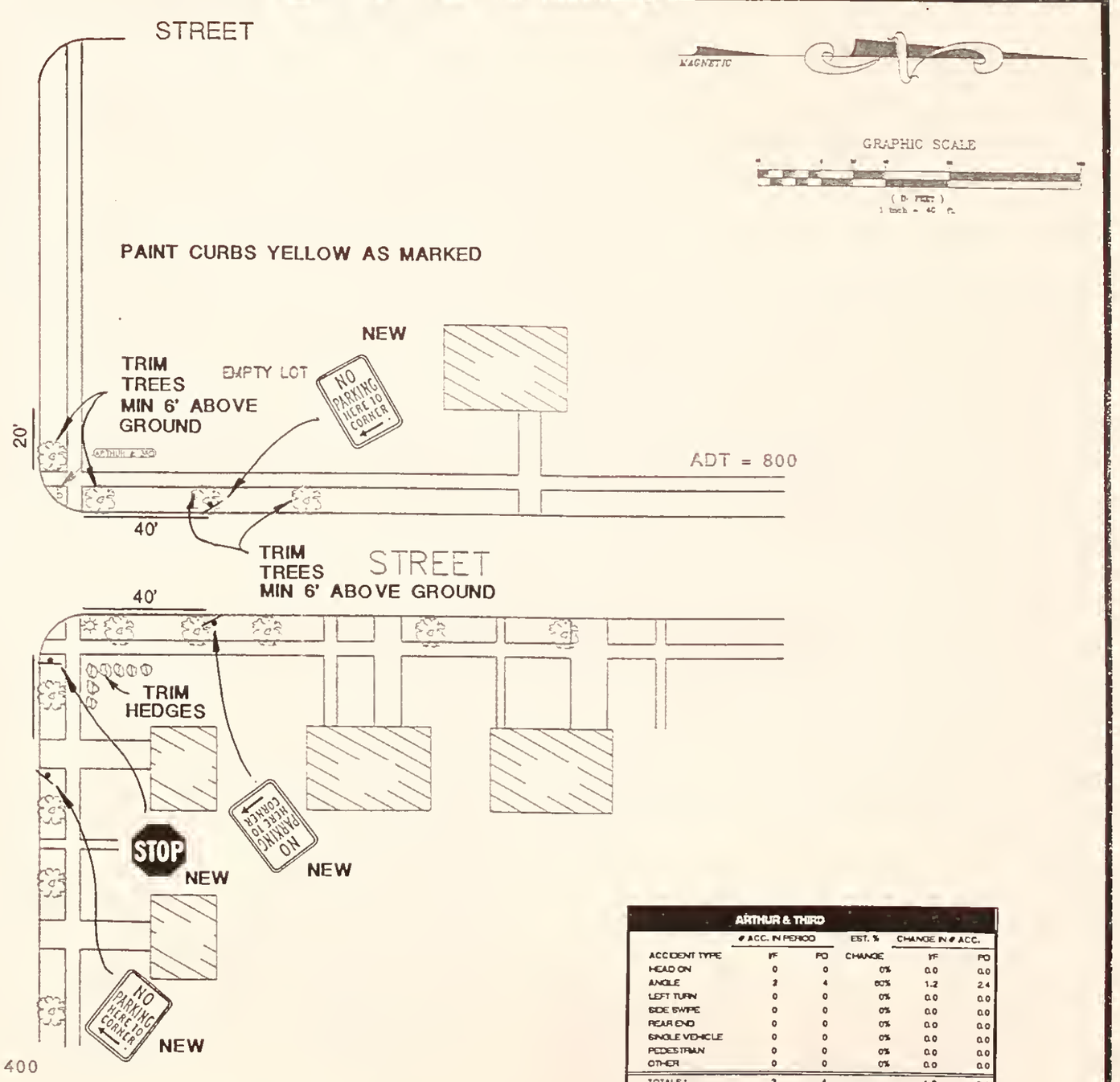
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

ARTHUR & THIRD

EXISTING CONDITIONS

SHEET 17





ARTHUR & THIRD — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	8	Ea	$100.00	$800.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	4	Gal	$15.00	$60.00
9	MISCELLANEOUS	0	EA	$0.00	$0.00
10	TRIM TREES	1	LS	$250.00	$250.00
11	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,110.00

ARTHUR & THIRD

ACCIDENT TYPE	# ACC. IN PERIOD PF	PD	EST. % CHANGE	CHANGE IN # ACC. PF	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	2	4	60%	1.2	2.4
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	2	4		1.2	2.4

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

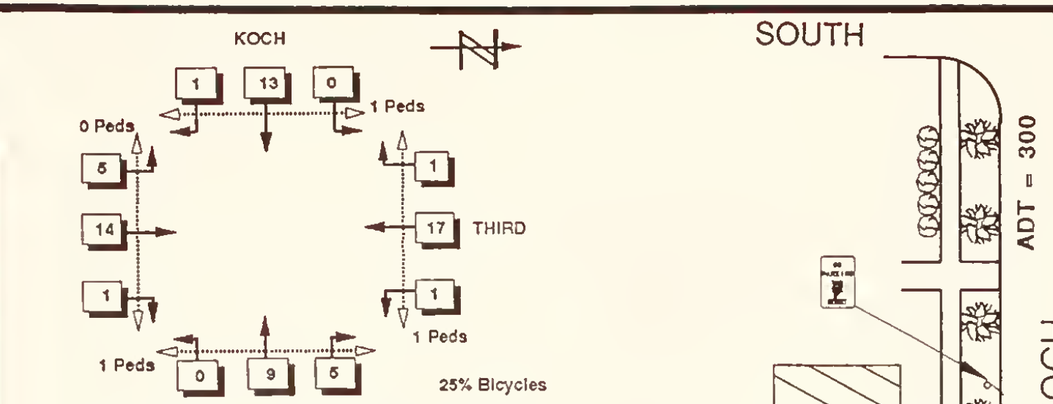
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

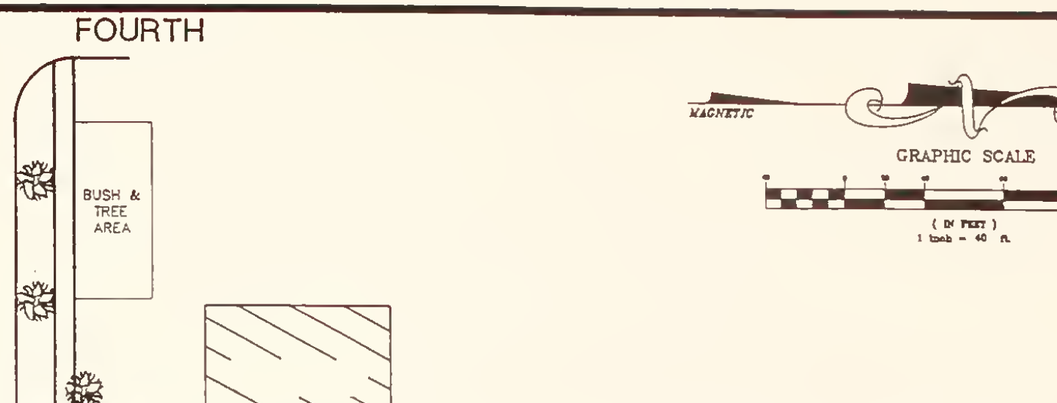
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

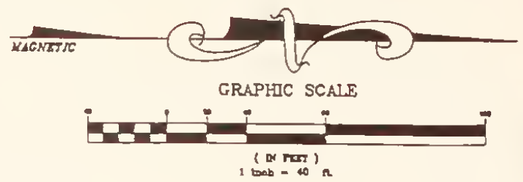
ARTHUR & THIRD

SHORT TERM IMPROVEMENTS

SHEET 18

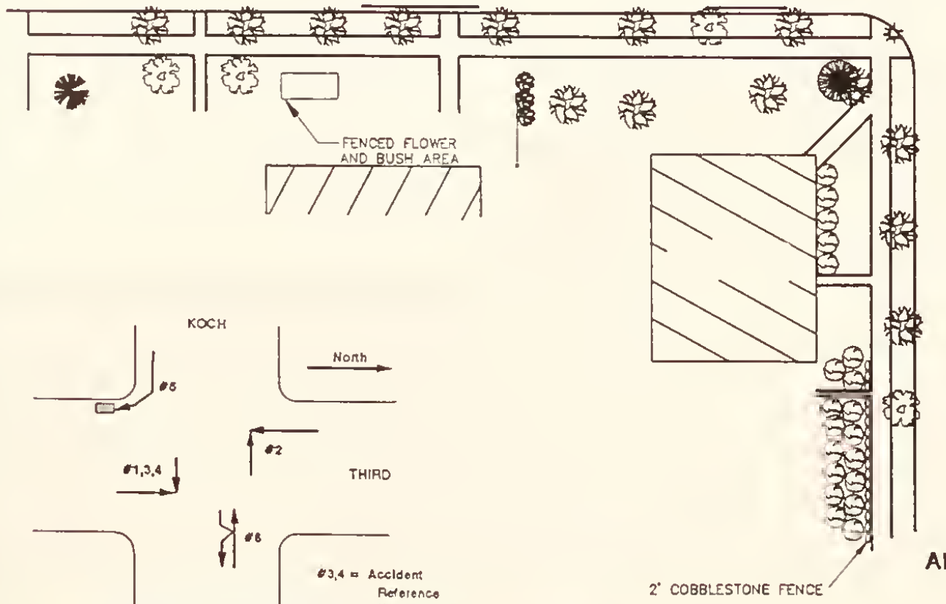






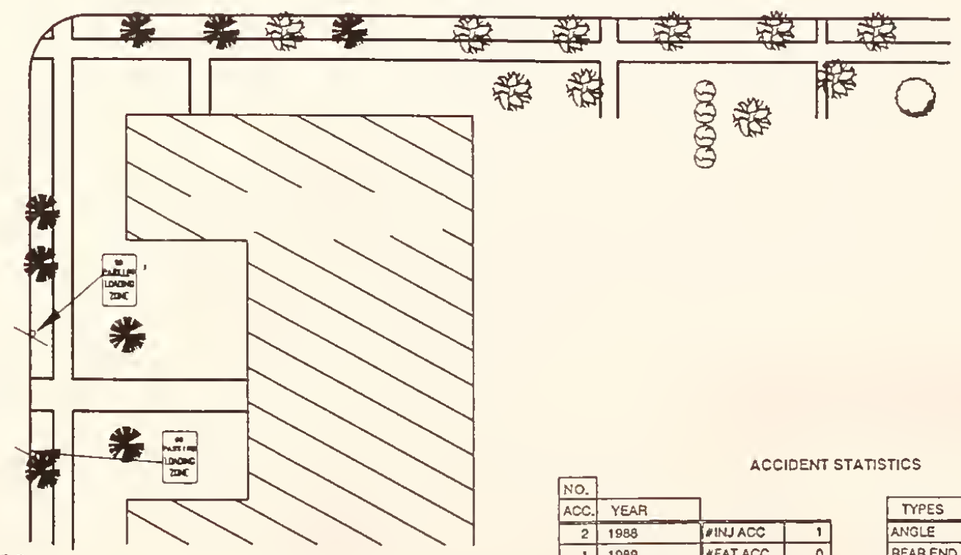
SOUTH

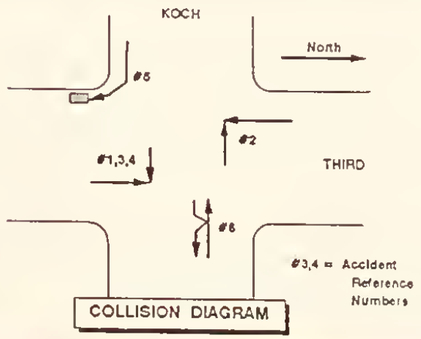
THIRD



WEST

ADT = 400





ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	1
1	1989	#FAT ACC	0
2	1990	#PDO ACC	5
1	1991	PERSON =	1 *
6	TOTAL	NIGHTIME	17%

* No. of Persons Injured

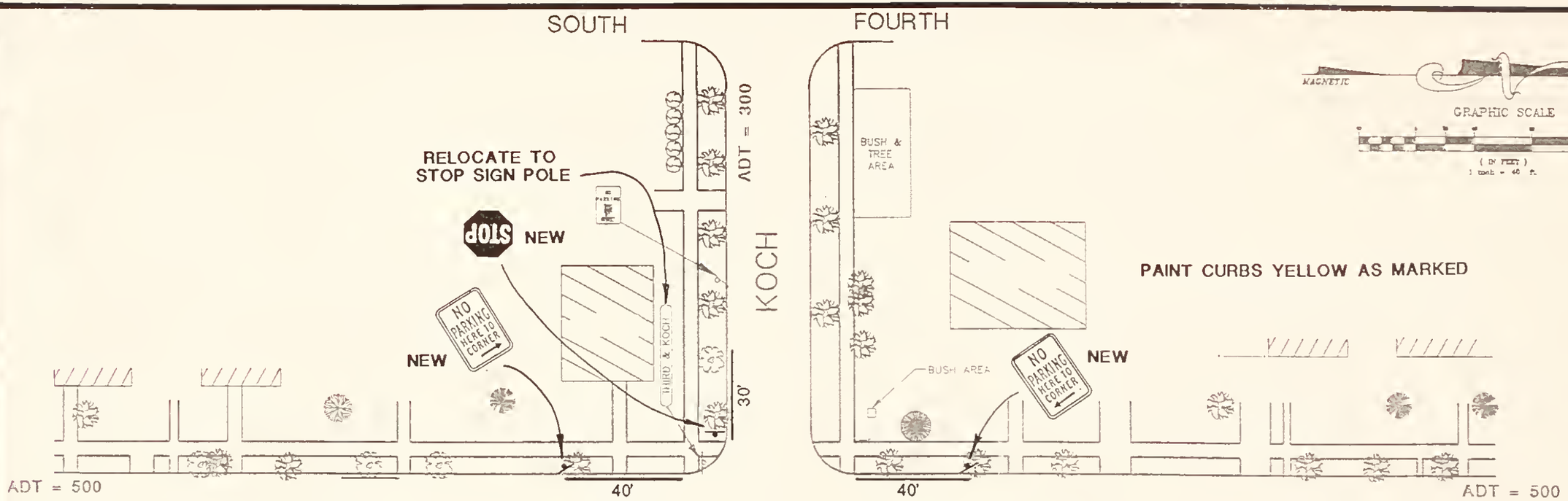
TYPES	NUMBER	ROAD	
ANGLE	4	DRY	50%
REAR END	0	WET	0%
SIDESWIPE	1	SNOW	0%
LEFT TRN	0	ICE	50%
OTHER	1	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

KOCH & THIRD

EXISTING CONDITIONS

SHEET 19



KOCK & THIRD **COST ESTIMATE**

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	7	Ea	$100.00	$700.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	5	Gal	$15.00	$75.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	LS	$100.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$775.00

KOCH & THIRD

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	PI	PD		PI	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	3	60%	0.6	1.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	1	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	1	20%	0.0	0.2
TOTALS:	1	5		0.6	2.0
% REDUCTION IN INJURY/FATAL ACCIDENTS =				60.0%	
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS =					40.0%

MARVIN & ASSOCIATES
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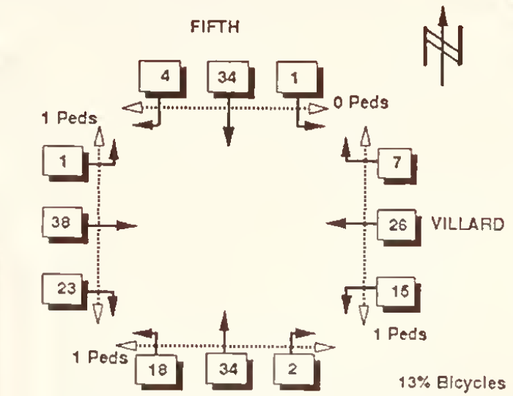
Billings, MT 59102

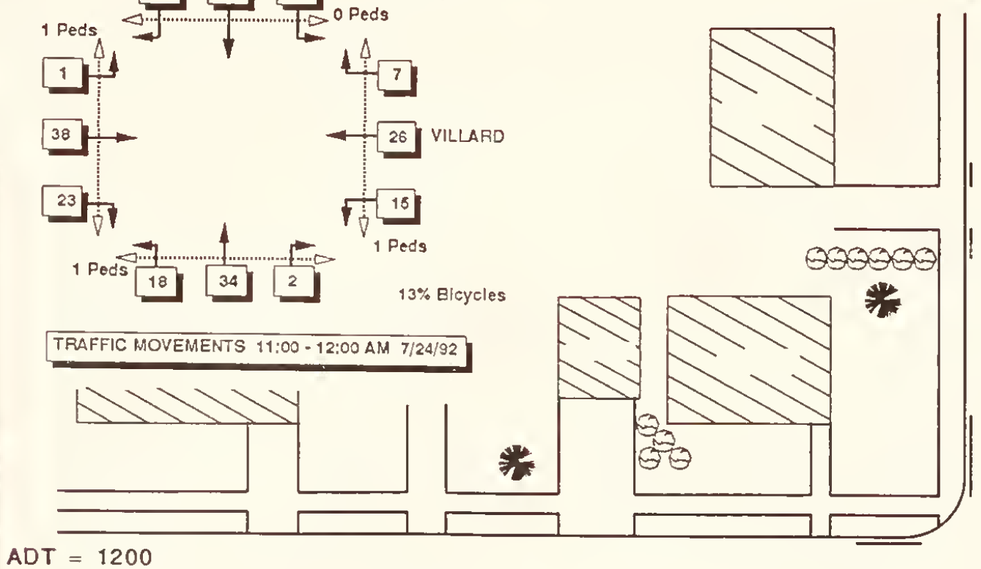
KOCH & THIRD

SHORT TERM IMPROVEMENTS

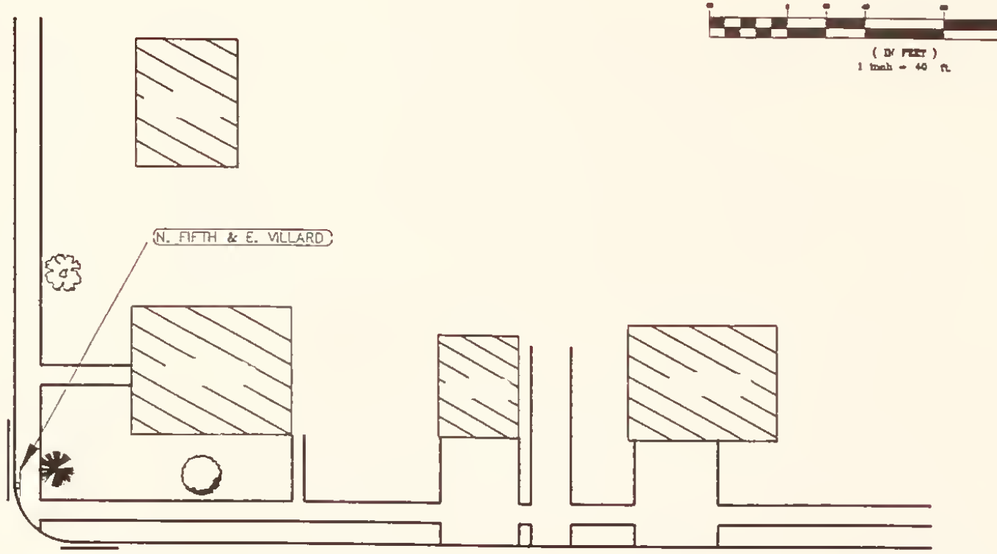
SHEET 20



ADT = 900



FIFTH

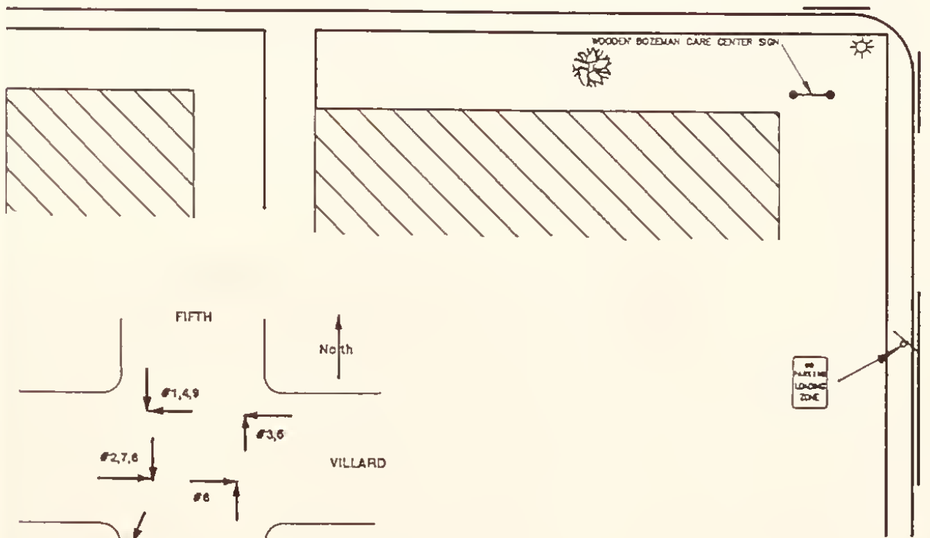


ADT = 1200

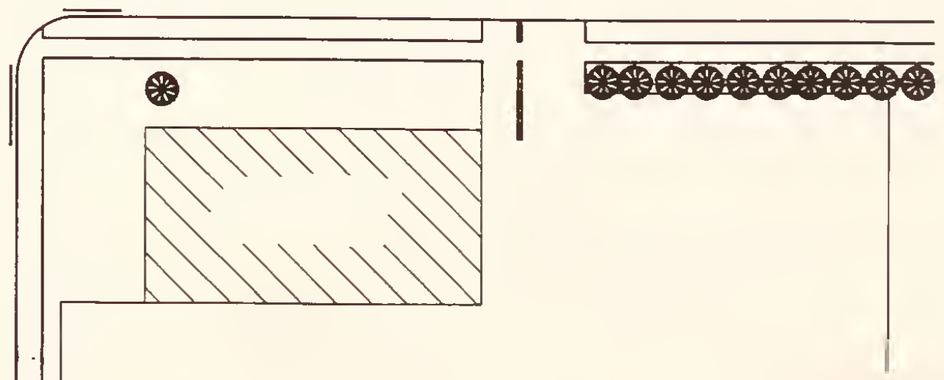
ADT = 1000

EAST

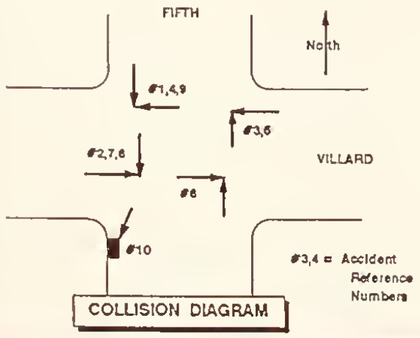
VILLARD



NORTH



PARKING LOT



COLLISION DIAGRAM

ADT = 1400

ACCIDENT STATISTICS

NO. ACC.	YEAR		
1	1988	#INJ ACC	1
2	1989	#FAT ACC	0
3	1990	#PDO ACC	9
4	1991	PERSON =	1 *
10	TOTAL	NIGHTIME	0%

TYPES	NUMBER	ROAD	
ANGLE	9	DRY	50%
REAR END	0	WET	10%
SIDESWIPE	0	SNOW	10%
LEFT TRN	0	ICE	30%
OTHER	1	OTHER	0%

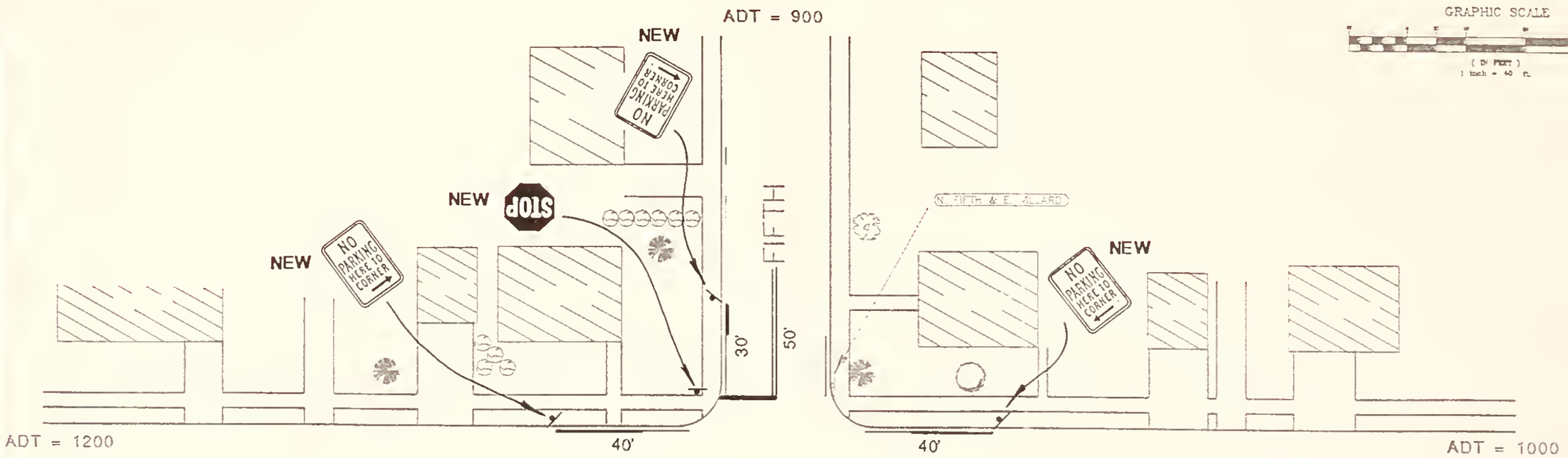
* No. of Persons Injured

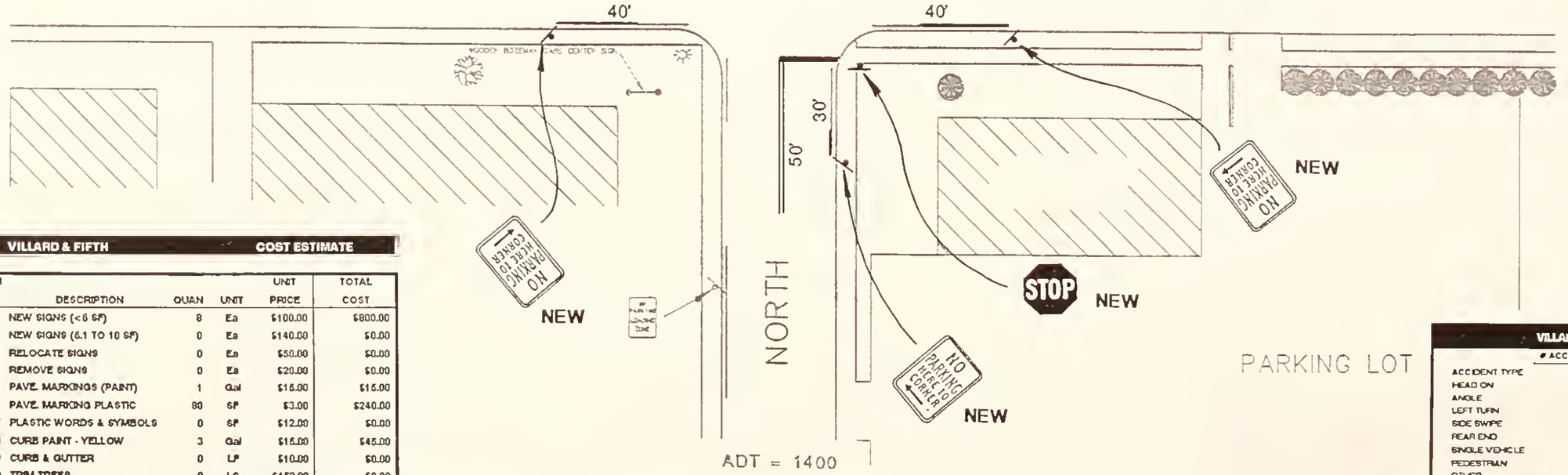
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

VILLARD & FIFTH

EXISTING CONDITIONS

SHEET 21





VILLARD & FIFTH — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	8	Ea	$100.00	$800.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	80	SF	$3.00	$240.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	3	Gal	$15.00	$45.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	LS	$150.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
12	MISCELLANEOUS	0	LS	$200.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,100.00

VILLARD & FIFTH

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	I/F	PD		I/F	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	9	60%	0.6	4.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	1	20%	0.0	0.2
TOTALS:	1	9		0.6	5.0

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

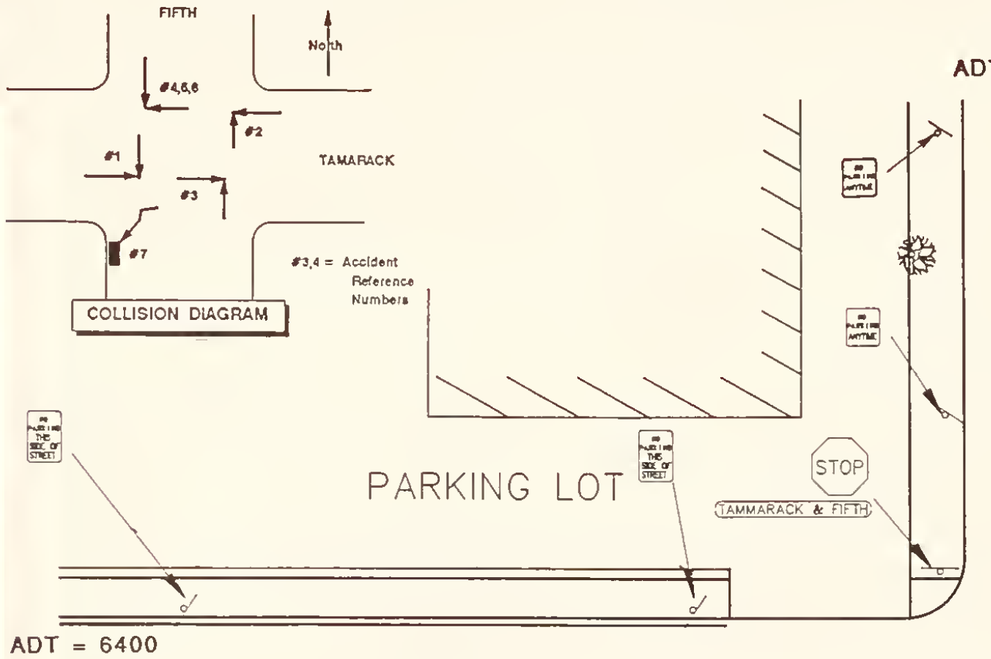
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 55.6%

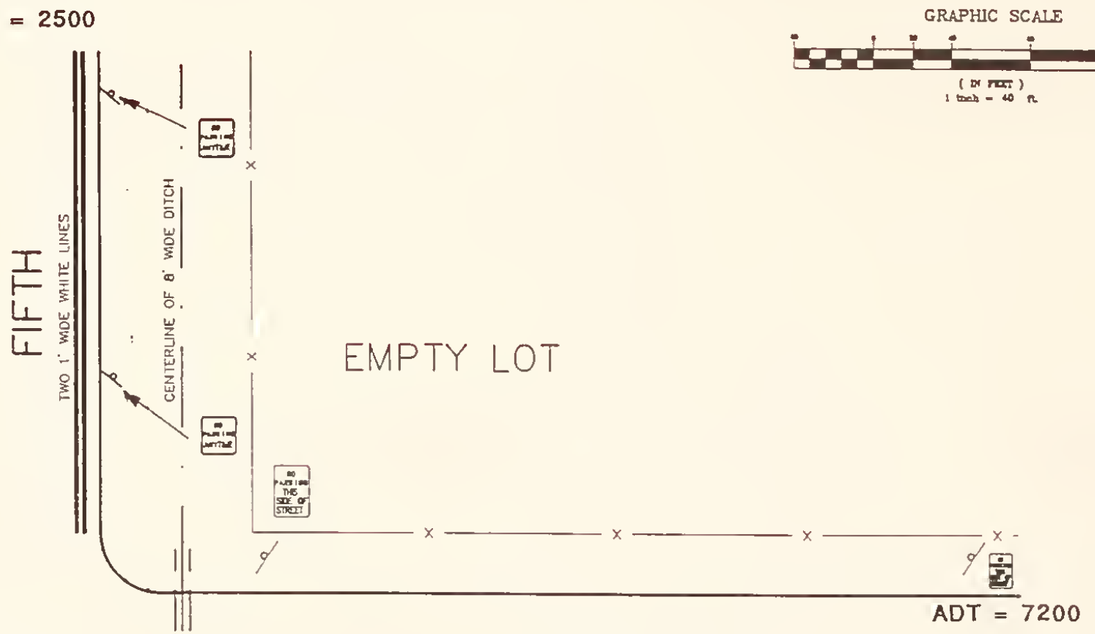
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

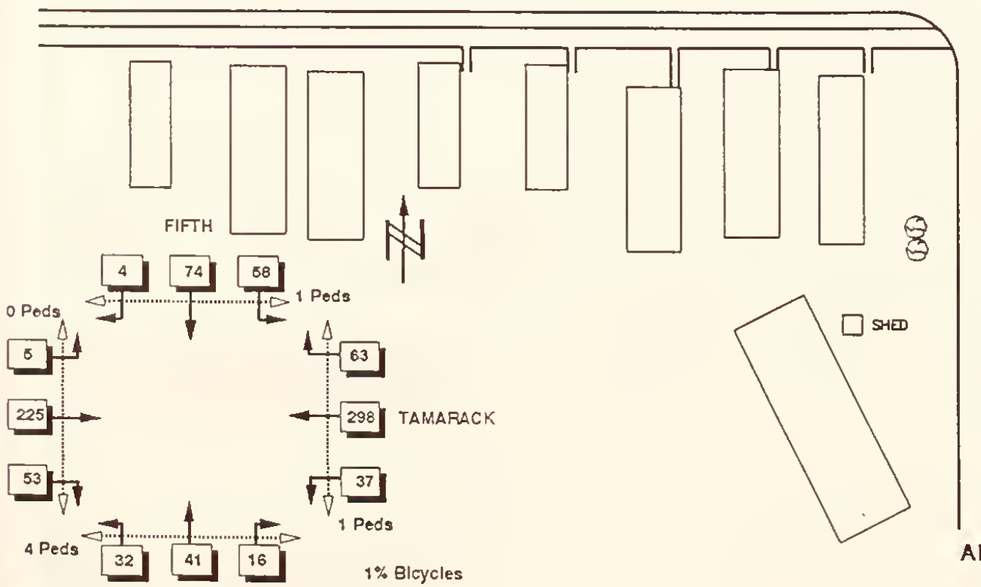
VILLARD & FIFTH

SHORT TERM IMPROVEMENTS

SHEET 22







TRAFFIC MOVEMENTS 3:00 - 4:00 PM 7/24/92

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

MAGNETIC

ACCIDENT STATISTICS

NO. ACC.	YEAR		
1	1988	#INJ ACC	3
2	1989	#FAT ACC	0
1	1990	#PDO ACC	4
3	1991	PERSON =	3 *
7	TOTAL	NIGHTIME	14%

* No. of Persons Injured

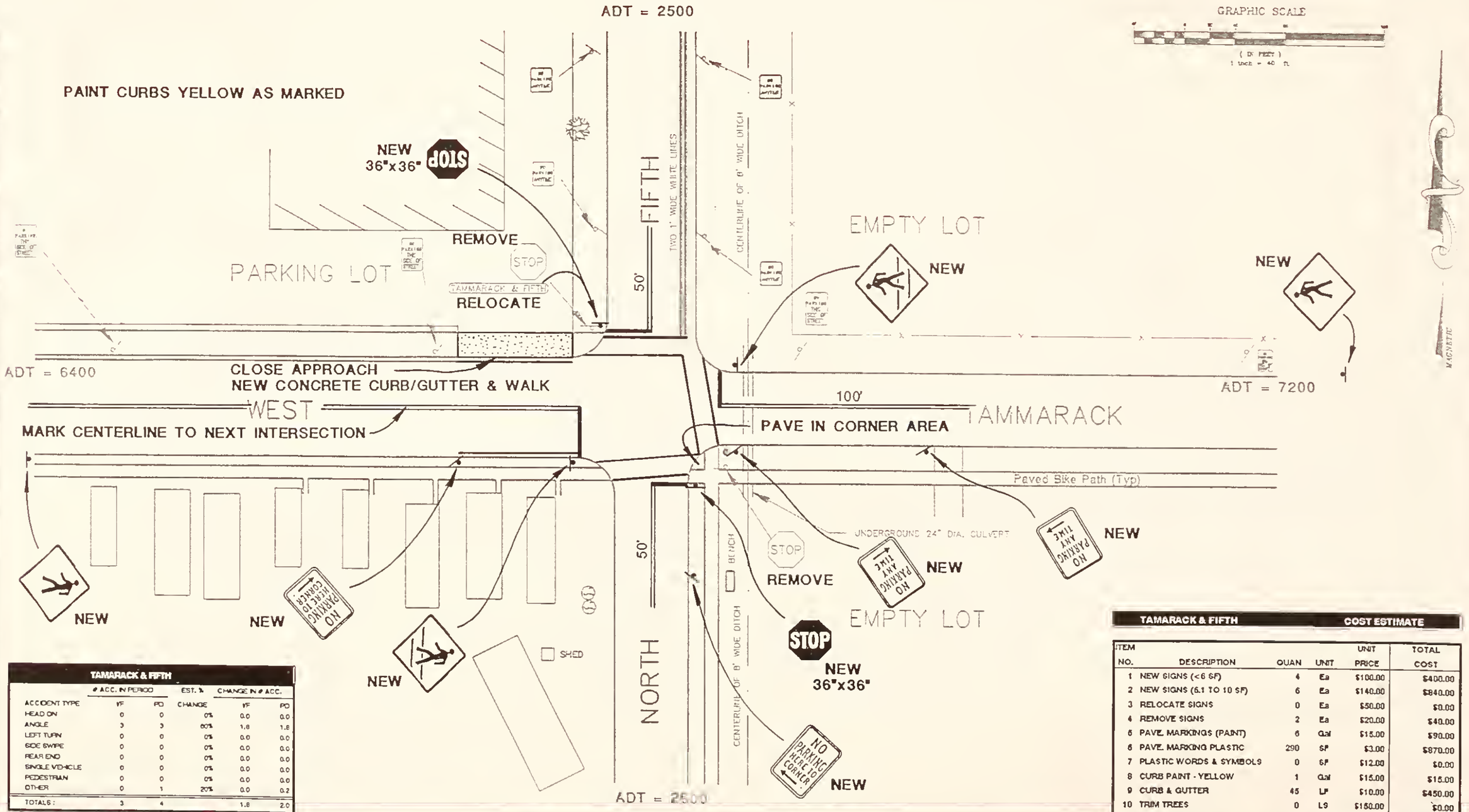
TYPES	NUMBER	ROAD	
ANGLE	6	DRY	43%
REAR END	0	WET	14%
SIDESWIPE	0	SNOW	14%
LEFT TRN	0	ICE	29%
OTHER	1	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

TAMARACK & FIFTH

EXISTING CONDITIONS

SHEET 23



TAMARACK & FIFTH

	# ACC. IN PERIOD		EST. %	CHANGE IN # ACC.	
ACCIDENT TYPE	WF	PD	CHANGE	WF	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	3	3	60%	1.8	1.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	1	20%	0.0	0.2
TOTALS :	3	4		1.8	2.0

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 50.0%

TAMARACK & FIFTH — COST ESTIMATE

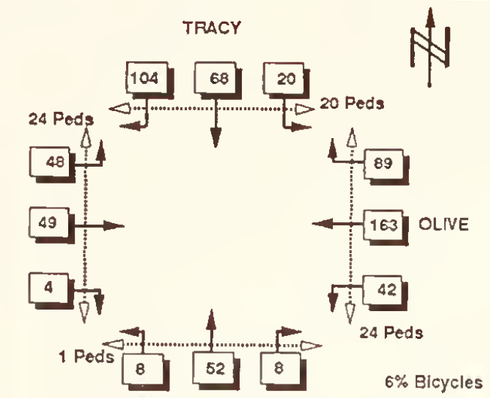
ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	4	Ea	$100.00	$400.00
2	NEW SIGNS (6.1 TO 10 SF)	6	Ea	$140.00	$840.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	2	Ea	$20.00	$40.00
5	PAVE. MARKINGS (PAINT)	6	Gal	$15.00	$90.00
6	PAVE. MARKING PLASTIC	290	SF	$3.00	$870.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	1	Gal	$15.00	$15.00
9	CURB & GUTTER	45	LF	$10.00	$450.00
10	TRIM TREES	0	LS	$150.00	$0.00
11	SIDEWALK	25	SY	$25.00	$625.00
12	MISCELLANEOUS	1	LS	$200.00	$200.00
	TOTAL CONSTRUCTION COSTS =				$3,630.00

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

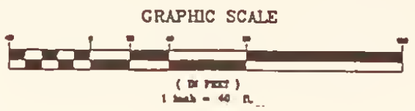
TAMARACK & FIFTH

SHORT TERM IMPROVEMENTS

SHEET 24



ADT = 4100



TRACY

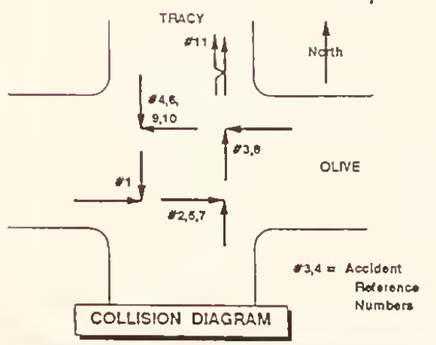
FEDERAL BUILDING
PARKING LOT

ADT = 4000

ADT = 4000

WEST

OLIVE



COLLISION DIAGRAM

SOUTH

ADT = 1900

ACCIDENT STATISTICS

NO. ACC.	YEAR		
4	1988	#INJ ACC	2
1	1989	#FAT ACC	0
2	1990	#PDO ACC	9
4	1991	PERSON -	2 *
11	TOTAL	NIGHTIME	13%

* No. of Persons Injured

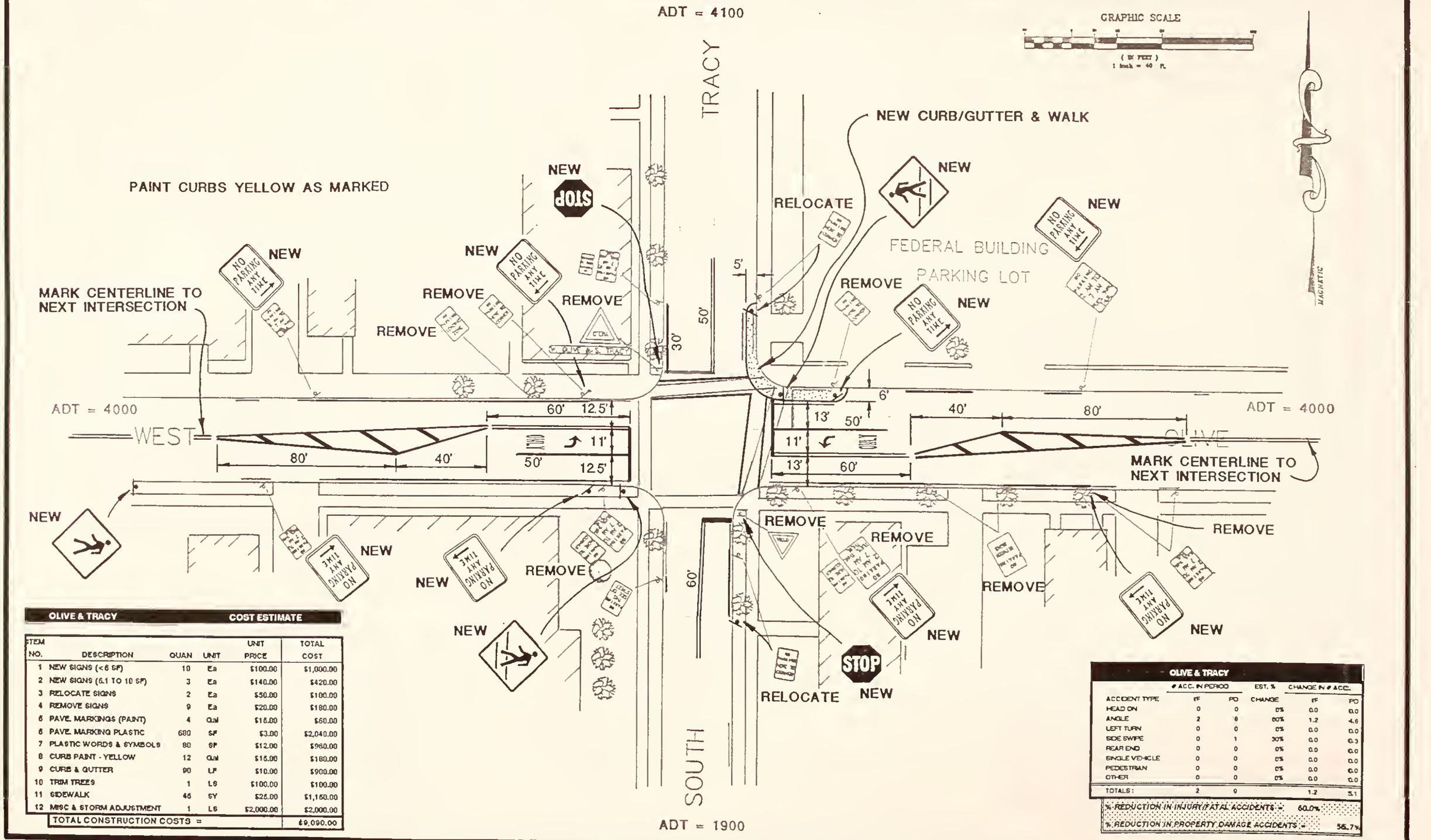
TYPES	NUMBER	ROAD	
ANGLE	10	DRY	73%
REAR END	0	WET	9%
SIDESWIPE	1	SNOW	0%
LEFT TRN	0	ICE	18%
OTHER	0	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & TRACY

EXISTING CONDITIONS

SHEET 25



OLIVE & TRACY — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	10	Ea	$100.00	$1,000.00
2	NEW SIGNS (6.1 TO 10 SF)	3	Ea	$140.00	$420.00
3	RELOCATE SIGNS	2	Ea	$50.00	$100.00
4	REMOVE SIGNS	9	Ea	$20.00	$180.00
5	PAVE. MARKINGS (PAINT)	4	Gal	$15.00	$60.00
6	PAVE. MARKING PLASTIC	680	SF	$3.00	$2,040.00
7	PLASTIC WORDS & SYMBOLS	80	SF	$12.00	$960.00
8	CURB PAINT - YELLOW	12	Gal	$15.00	$180.00
9	CURB & GUTTER	90	LF	$10.00	$900.00
10	TRIM TREES	1	LS	$100.00	$100.00
11	SIDEWALK	46	SY	$25.00	$1,150.00
12	MISC & STORM ADJUSTMENT	1	LS	$2,000.00	$2,000.00
	TOTAL CONSTRUCTION COSTS =				$9,090.00

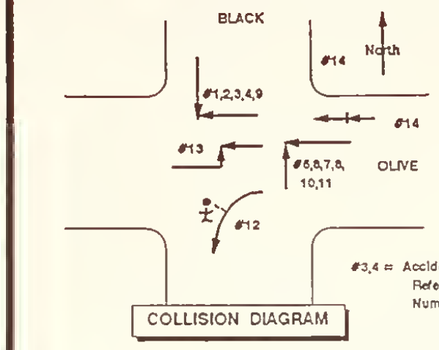
OLIVE & TRACY

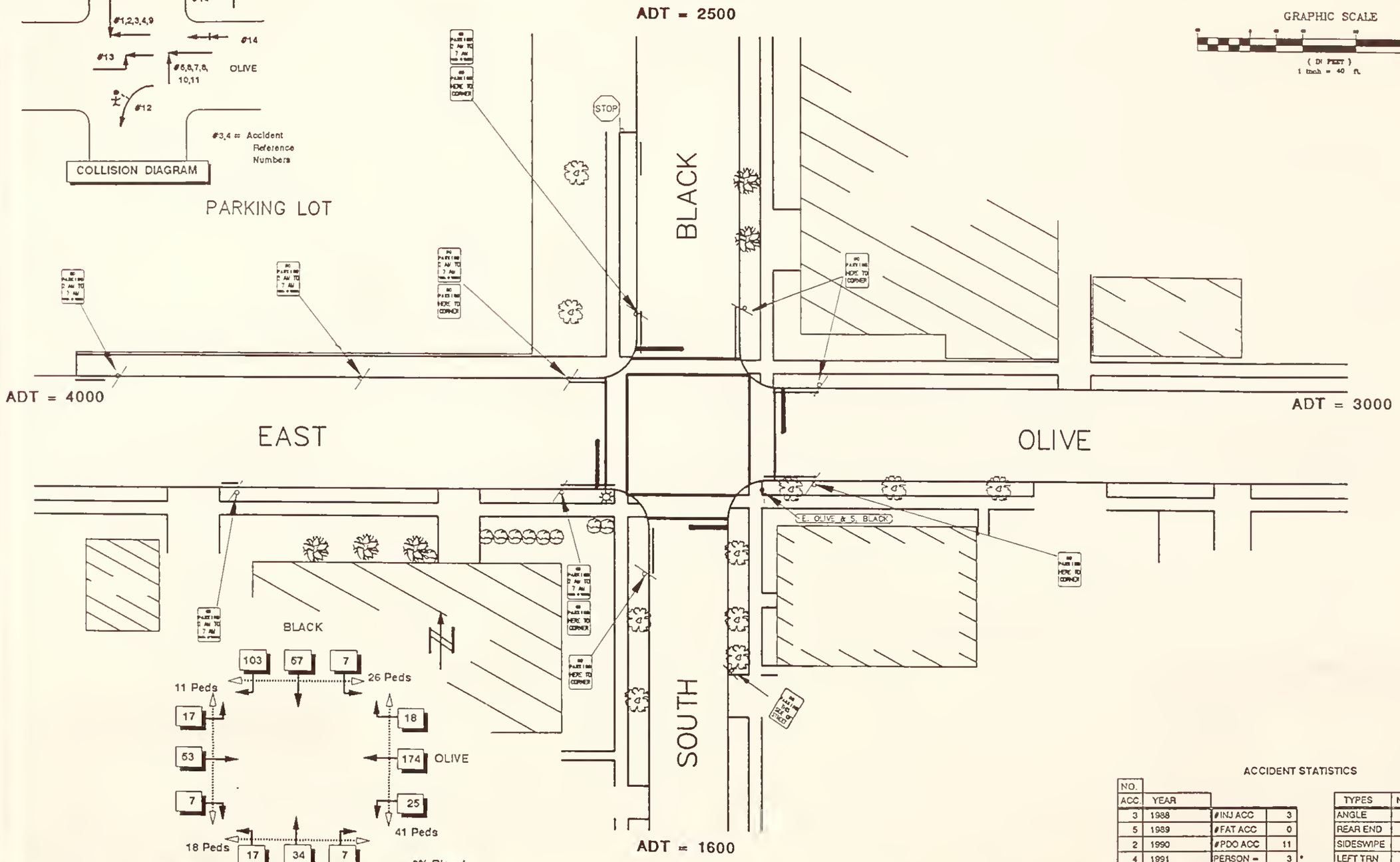
	# ACC. IN PERIOD		EST. %	CHANGE IN # ACC.	
ACCIDENT TYPE	PF	PD	CHANGE	PF	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	2	8	80%	1.2	4.8
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	1	30%	0.0	0.3
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	2	9		1.2	5.1
% REDUCTION IN INJURY/FATAL ACCIDENTS =				60.0%	
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS =					56.7%

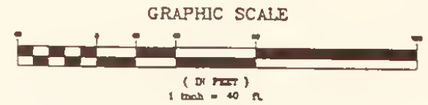
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & TRACY

SHORT TERM IMPROVEMENTS







TRAFFIC MOVEMENTS 4:00 - 5:00 PM 7/13/92

ACCIDENT STATISTICS

NO. ACC.	YEAR		
3	1988	#INJ ACC	3
5	1989	#FAT ACC	0
2	1990	#PDO ACC	11
4	1991	PERSON =	3 *
14	TOTAL	NIGHTIME	21%

TYPES	NUMBER	ROAD	
ANGLE	11	DRY	64%
REAR END	1	WET	7%
SIDESWIPE	0	SNOW	7%
LEFT TRN	1	ICE	21%
OTHER	1	OTHER	0%

* No. of Persons Injured

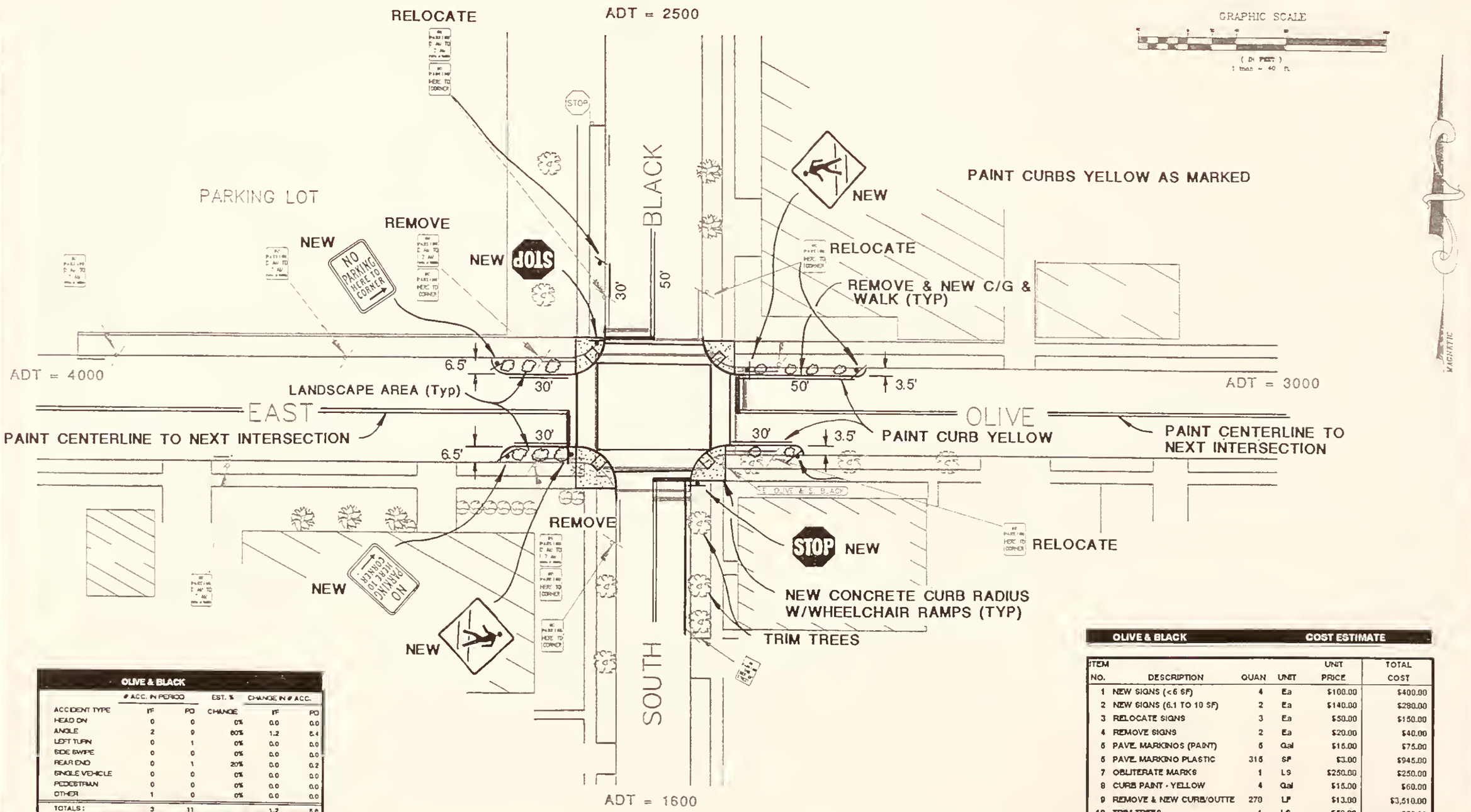
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers

1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & BLACK

EXISTING CONDITIONS

SHEET 27



OLIVE & BLACK

ACCIDENT TYPE	# ACC. IN PERIOD I/F	# ACC. IN PERIOD P/D	EST. % CHANGE	CHANGE IN # ACC. I/F	CHANGE IN # ACC. P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	2	9	60%	1.2	5.4
LEFT TURN	0	1	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	1	20%	0.0	0.2
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	1	0	0%	0.0	0.0
TOTALS:	3	11		1.2	5.6

% REDUCTION IN INJURY/FATAL ACCIDENTS = 40.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 50.9%

OLIVE & BLACK — COST ESTIMATE

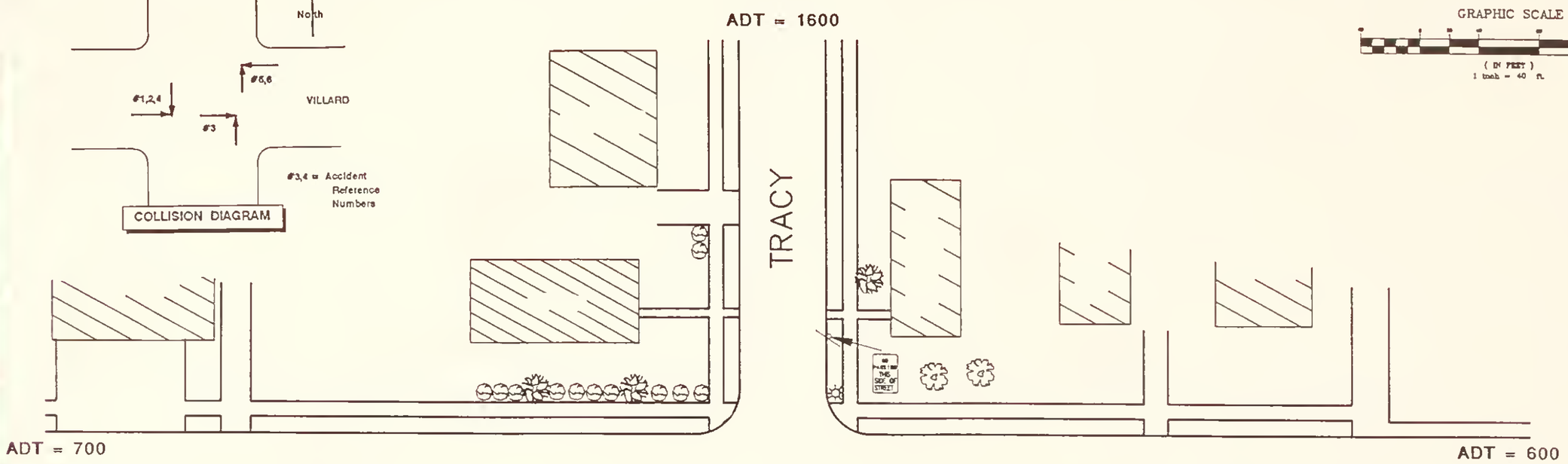
ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	4	Ea	$100.00	$400.00
2	NEW SIGNS (6.1 TO 10 SF)	2	Ea	$140.00	$280.00
3	RELOCATE SIGNS	3	Ea	$50.00	$150.00
4	REMOVE SIGNS	2	Ea	$20.00	$40.00
5	PAVE. MARKINGS (PAINT)	5	Gal	$15.00	$75.00
6	PAVE. MARKING PLASTIC	315	SF	$3.00	$945.00
7	OBLITERATE MARKS	1	LS	$250.00	$250.00
8	CURB PAINT - YELLOW	4	Gal	$15.00	$60.00
9	REMOVE & NEW CURB/GUTTE	270	LF	$13.00	$3,510.00
10	TRIM TREES	1	LS	$50.00	$50.00
11	SIDEWALK	60	SY	$25.00	$1,500.00
12	MISC & STORM ADJUSTMENT	1	LS	$3,800.00	$3,800.00
	TOTAL CONSTRUCTION COSTS =				$11,060.00

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & BLACK

SHORT TERM IMPROVEMENTS

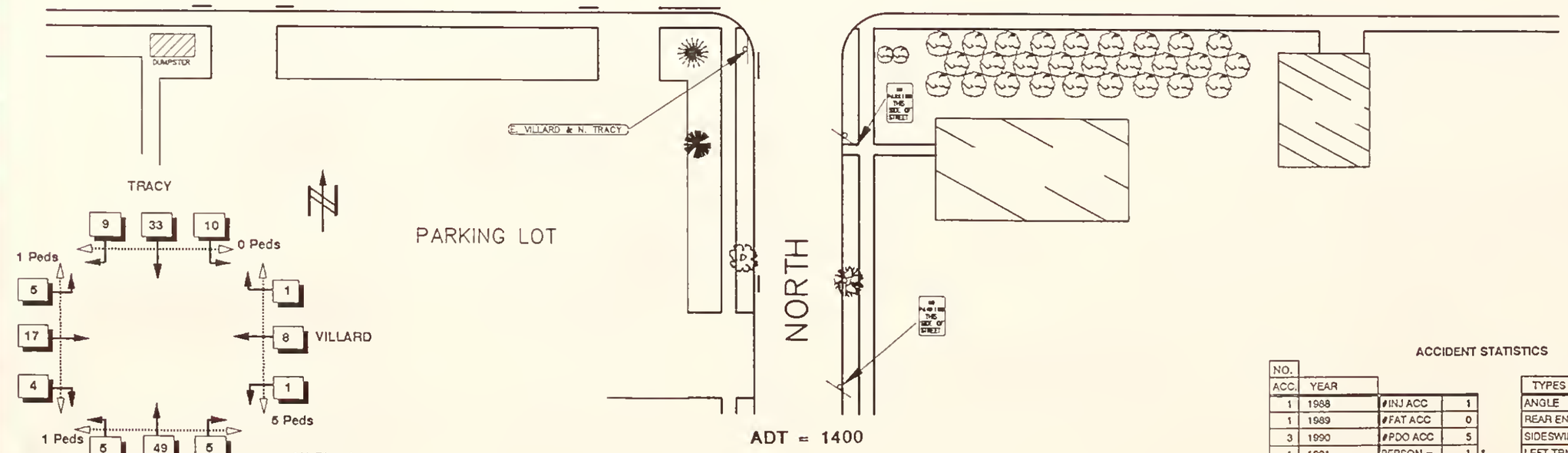
SHEET 28



GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

MAGNETIC



TRAFFIC MOVEMENTS 10:00 - 11:00 AM 7/24/92

ACCIDENT STATISTICS

NO. ACC.	YEAR		
1	1988	#INJ ACC	1
1	1989	#FAT ACC	0
3	1990	#PDO ACC	5
1	1991	PERSON =	1 *
6	TOTAL	NIGHTIME	17%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	6	DRY	50%
REAR END	0	WET	0%
SIDESWIPE	0	SNOW	17%
LEFT TRN	0	ICE	33%
OTHER	0	OTHER	0%

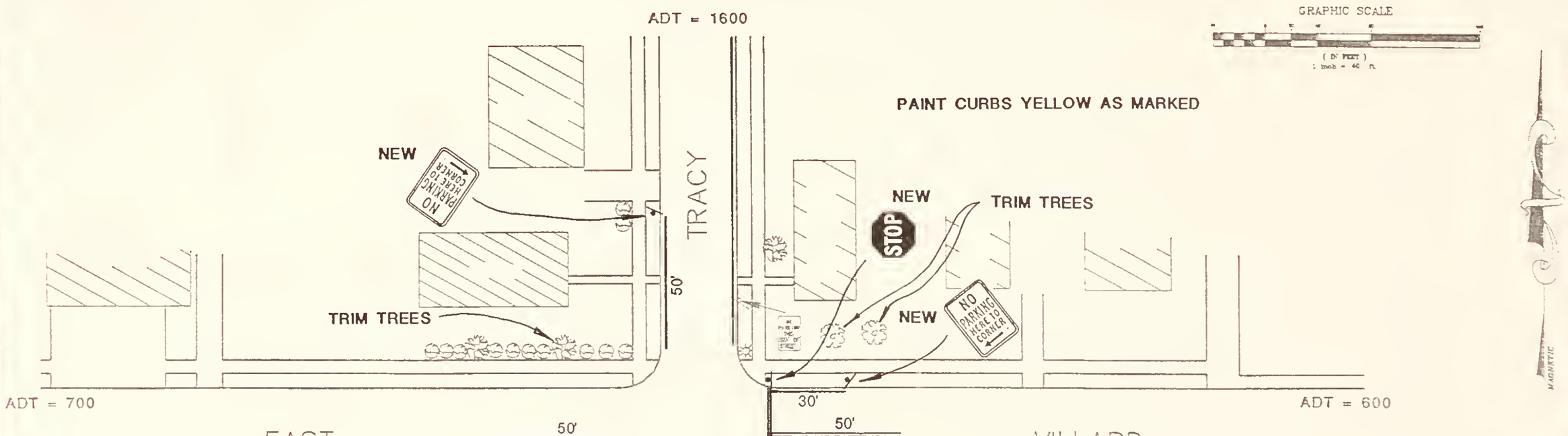
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers

1127 Alderson Ave. #204
Billings, MT 59102

VILLARD & TRACY

EXISTING CONDITIONS

SHEET 29



VILLARD & TRACY

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	I/F	PD		I/F	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	6	60%	0.6	3.0
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	1	6		0.6	3.0

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

VILLARD & TRACY — COST ESTIMATE

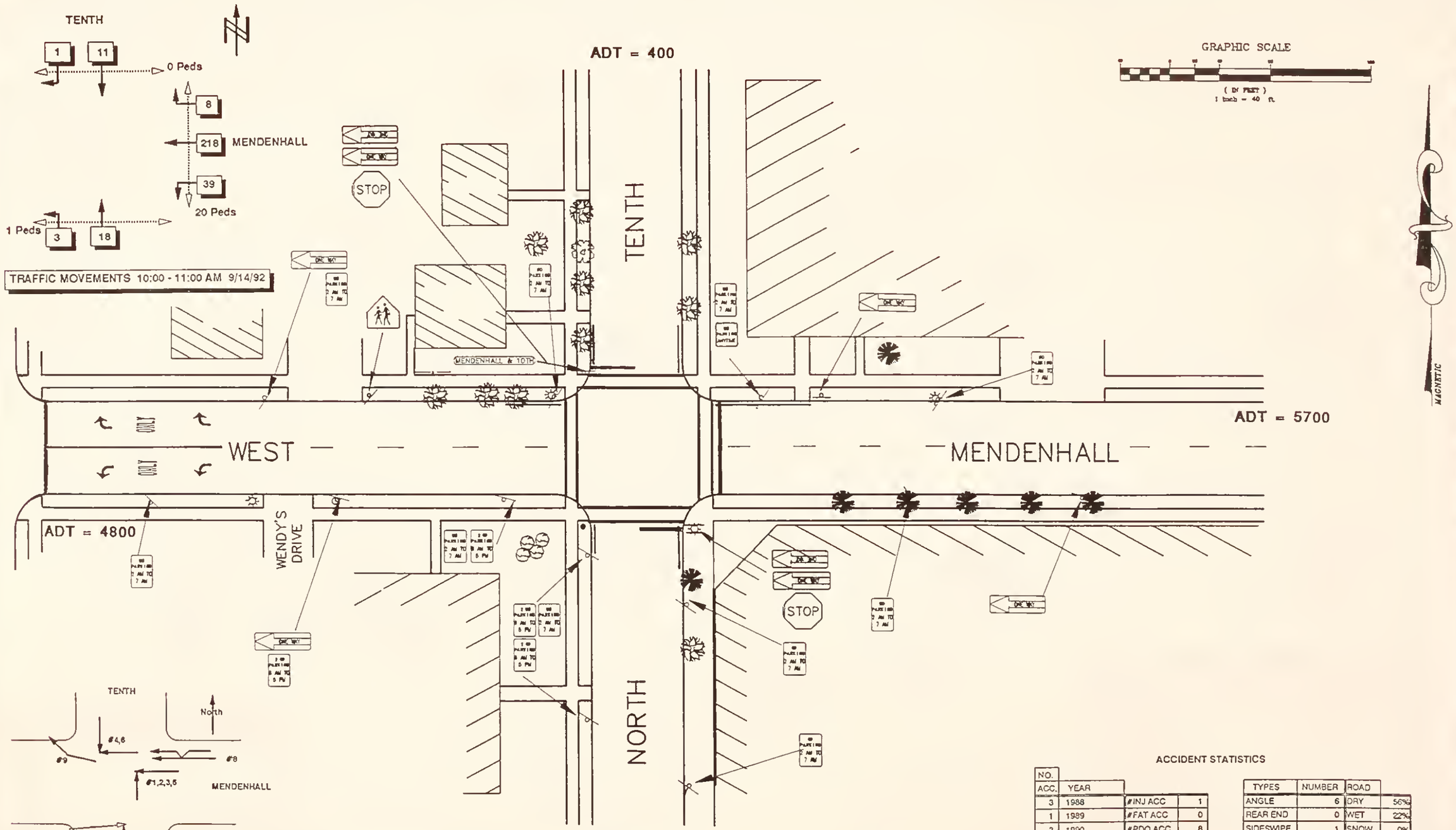
ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	6	Ea	$100.00	$600.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	72	SF	$3.00	$216.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	12	Gal	$15.00	$180.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$200.00	$200.00
11	SIDEWALK	0	SY	$25.00	$0.00
12	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,211.00

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

VILLARD & TRACY

SHORT TERM IMPROVEMENTS

SHEET 30



ACCIDENT STATISTICS

NO. ACC.	YEAR		
3	1988	#INJ ACC	1
1	1989	#FAT ACC	0
3	1990	#PDO ACC	8
2	1991	PERSON =	1 *
9	TOTAL	NIGHTIME	11%

* No. of f ns injured

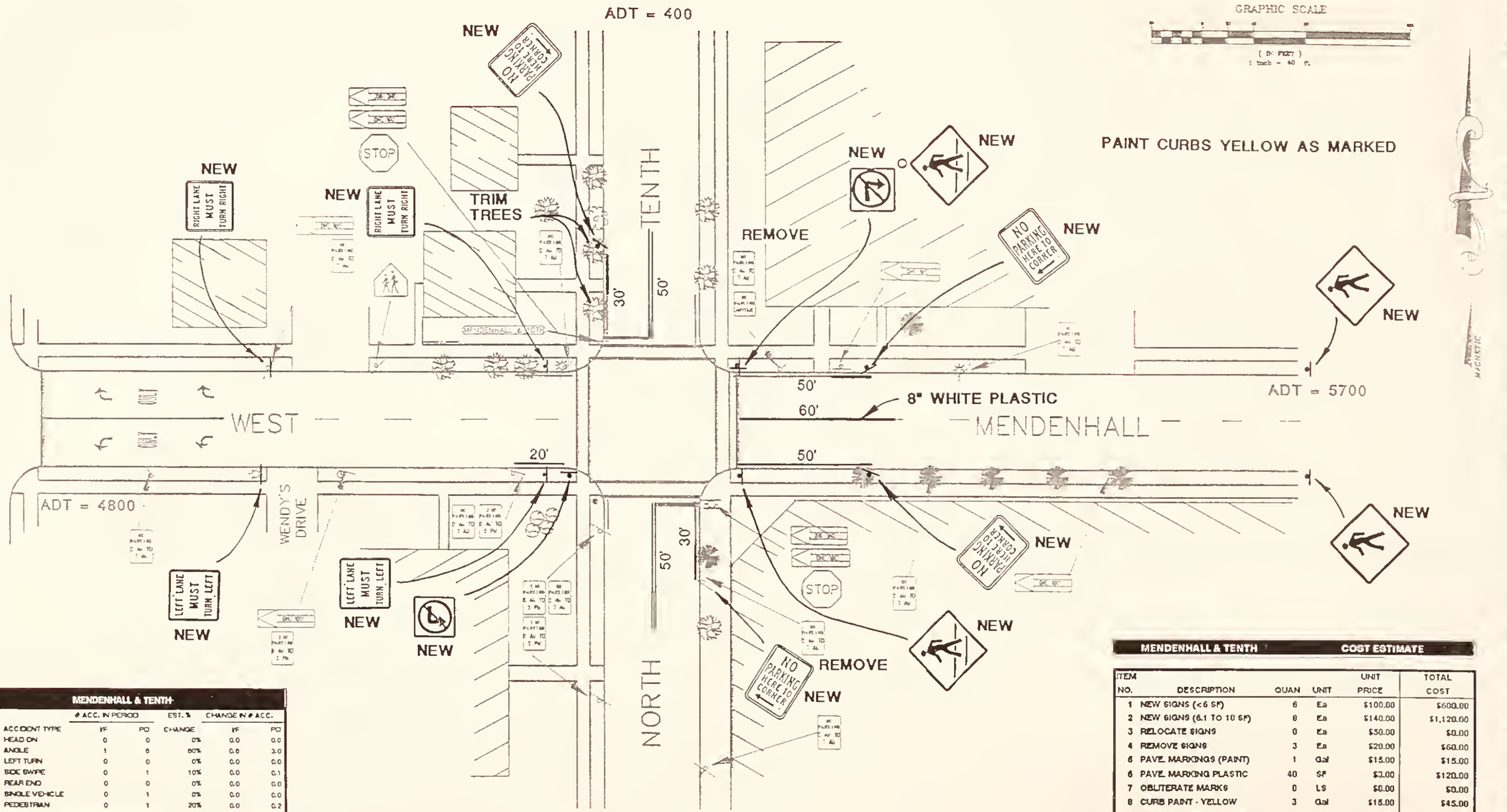
TYPES	NUMBER	ROAD	
ANGLE	6	DRY	56%
REAR END	0	WET	22%
SIDESWIPE	1	SNOW	0%
LEFT TRN	0	ICE	22%
OTHER	2	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

MENDENHALL & TENTH

EXISTING CONDITIONS

SHEET 31



MENDENHALL & TENTH

	# ACC. IN PERIOD		EST. %	CHANGE IN # ACC.	
ACCIDENT TYPE	I/F	P/D	CHANGE	I/F	P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	6	60%	0.6	3.6
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	1	10%	0.0	0.1
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	1	0%	0.0	0.0
PEDESTRIAN	0	1	20%	0.0	0.2
OTHER	0	0	0%	0.0	0.0
TOTALS:	1	9		0.6	3.9

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 41.3%

MENDENHALL & TENTH — COST ESTIMATE

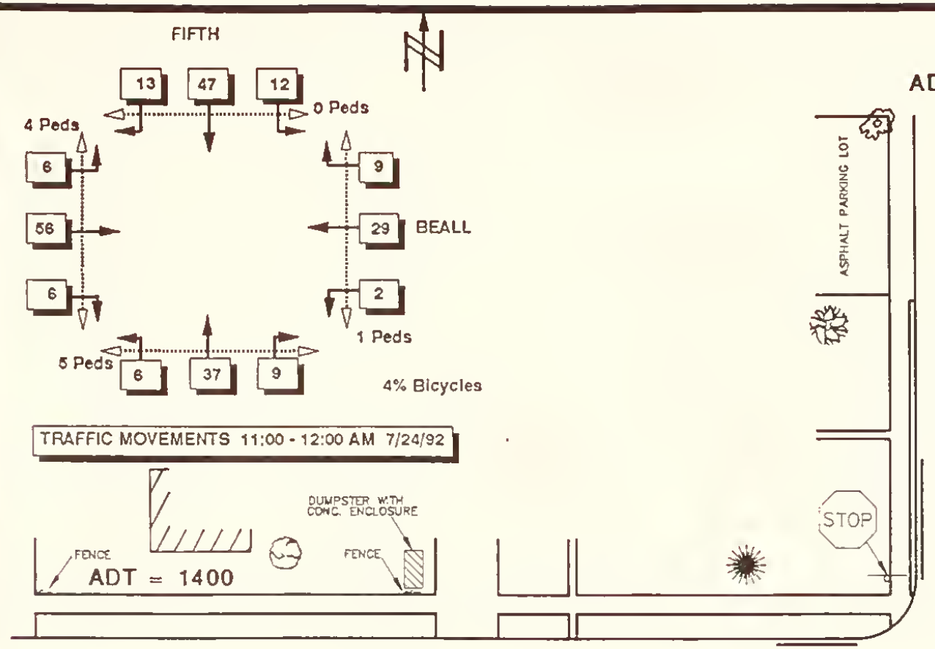
ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	6	Ea	$100.00	$600.00
2	NEW SIGNS (6.1 TO 10 SF)	8	Ea	$140.00	$1,120.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	3	Ea	$20.00	$60.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	40	SF	$3.00	$120.00
7	OBLITERATE MARKS	0	LS	$0.00	$0.00
8	CURB PAINT - YELLOW	3	Gal	$15.00	$45.00
9	PLASTIC WORDS & SYMBOLS	0	SF	$13.00	$0.00
10	TRIM TREES	1	LS	$50.00	$50.00
11	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$2,010.00

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

MENDENHALL & TENTH

SHORT TERM IMPROVEMENTS

SHEET 32



ACCIDENT STATISTICS

NO. ACC.	YEAR		
1	1988	#INJ ACC	2
1	1989	#FAT ACC	0
2	1990	#PDO ACC	3
1	1991	PERSON =	2 *
5	TOTAL	NIGHTIME	60%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	2	DRY	40%
REAR END	0	WET	20%
SIDESWIPE	1	SNOW	0%
LEFT TRN	1	ICE	40%
OTHER	1	OTHER	0%

MARVIN & ASSOCIATES
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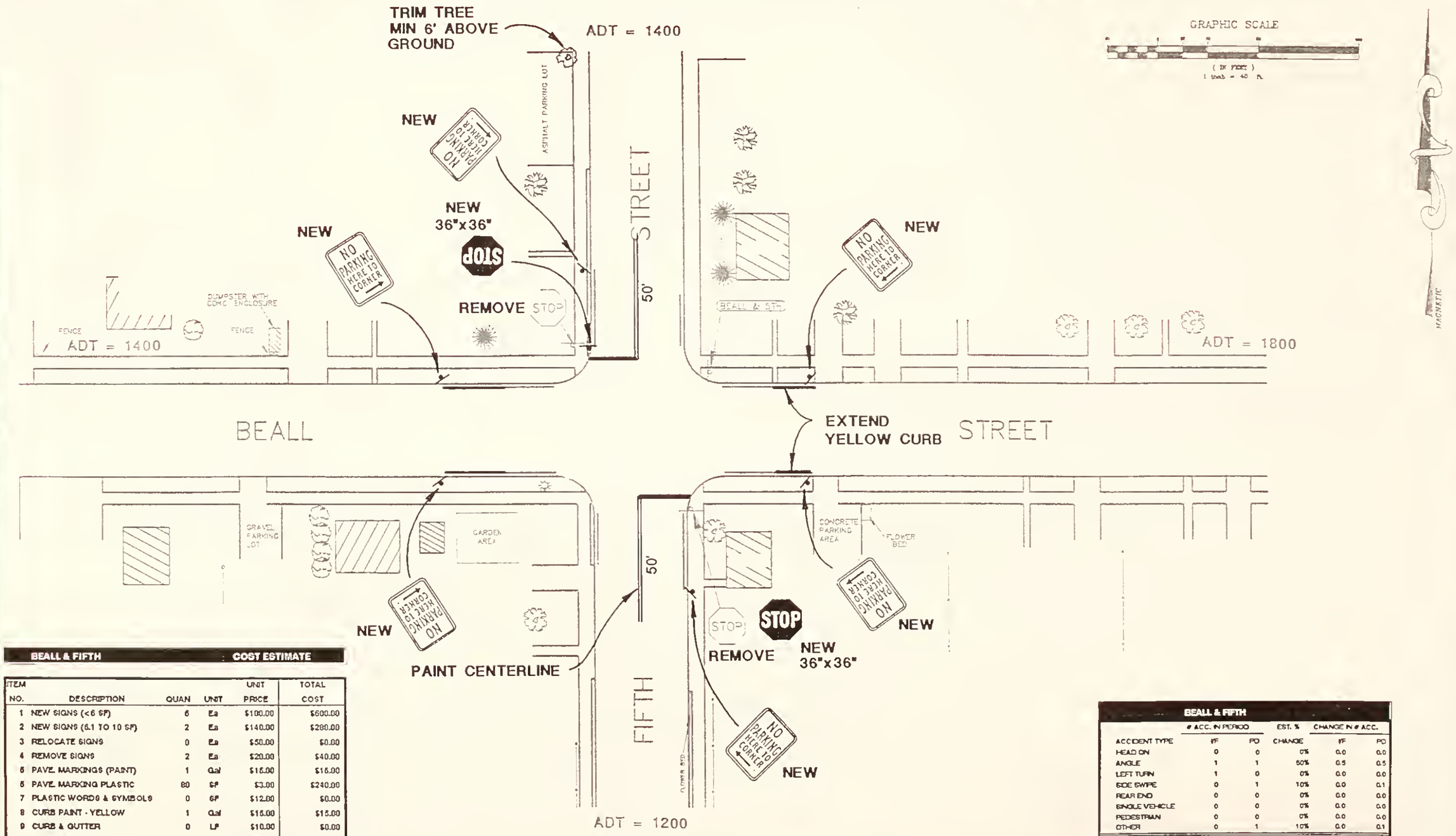
1127 Alderson Ave. #204
Billings, MT 59102

BEALL & FIFTH

EXISTING CONDITIONS

SHEET 33



BEALL & FIFTH : COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	6	Ea	$100.00	$600.00
2	NEW SIGNS (6.1 TO 10 SF)	2	Ea	$140.00	$280.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	2	Ea	$20.00	$40.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	80	SF	$3.00	$240.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	1	Gal	$15.00	$15.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$50.00	$50.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,240.00

BEALL & FIFTH

	# ACC. IN PERIOD		EST. %	CHANGE IN # ACC.	
ACCIDENT TYPE	PF	PD	CHANGE	PF	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	1	50%	0.5	0.5
LEFT TURN	1	0	0%	0.0	0.0
SIDE SWIPE	0	1	10%	0.0	0.1
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	1	10%	0.0	0.1
TOTALS:	2	3		0.5	0.7

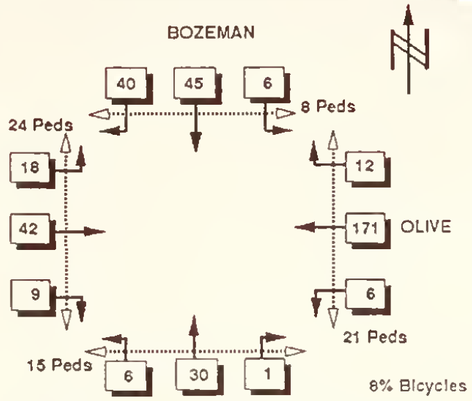
% REDUCTION IN INJURY/FATAL ACCIDENTS = 25.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 23.3%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

BEALL & FIFTH

SHORT TERM IMPROVEMENTS



TRAFFIC MOVEMENTS 4:00 - 5:00 PM 7/13/92

ADT = 1600

ADT = 3000

BOZEMAN

ADT = 2500

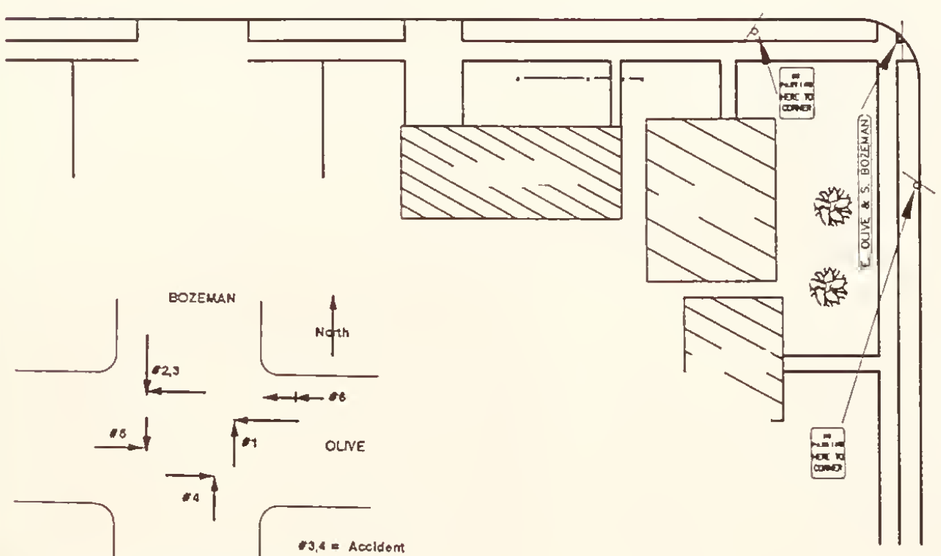
GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

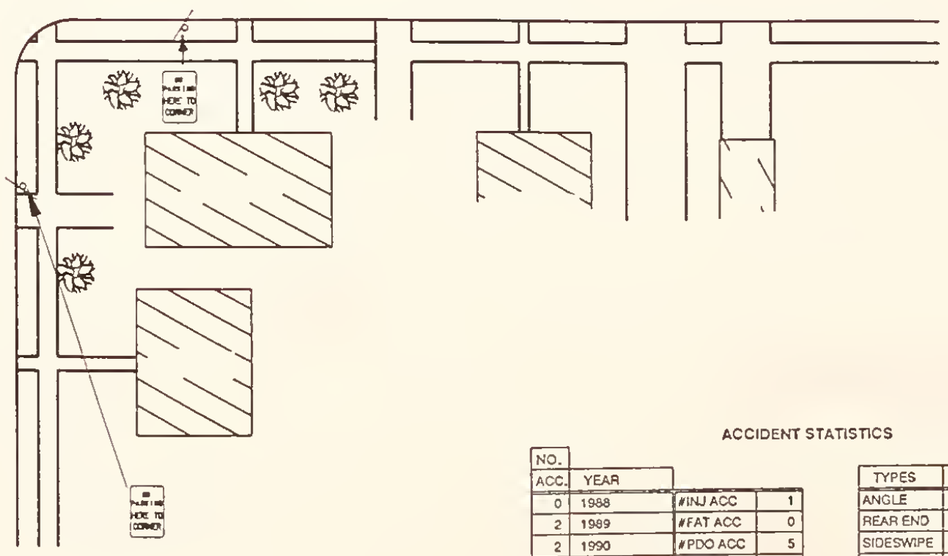
MAGNETIC

EAST

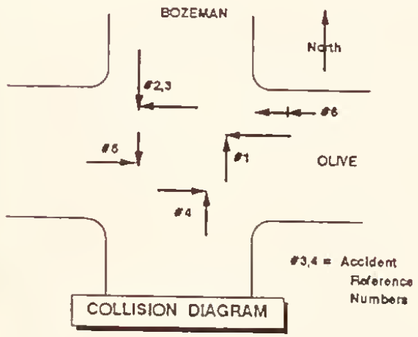
OLIVE



SOUTH



ADT = 1000



COLLISION DIAGRAM

ACCIDENT STATISTICS

NO. ACC.	YEAR		
0	1988	#INJ ACC	1
2	1989	#FAT ACC	0
2	1990	#PDO ACC	5
2	1991	PERSON =	1 *
6	TOTAL	NIGHTIME	21%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	5	DRY	50%
REAR END	1	WET	0%
SIDESWIPE	0	SNOW	33%
LEFT TRN	0	ICE	17%
OTHER	0	OTHER	0%

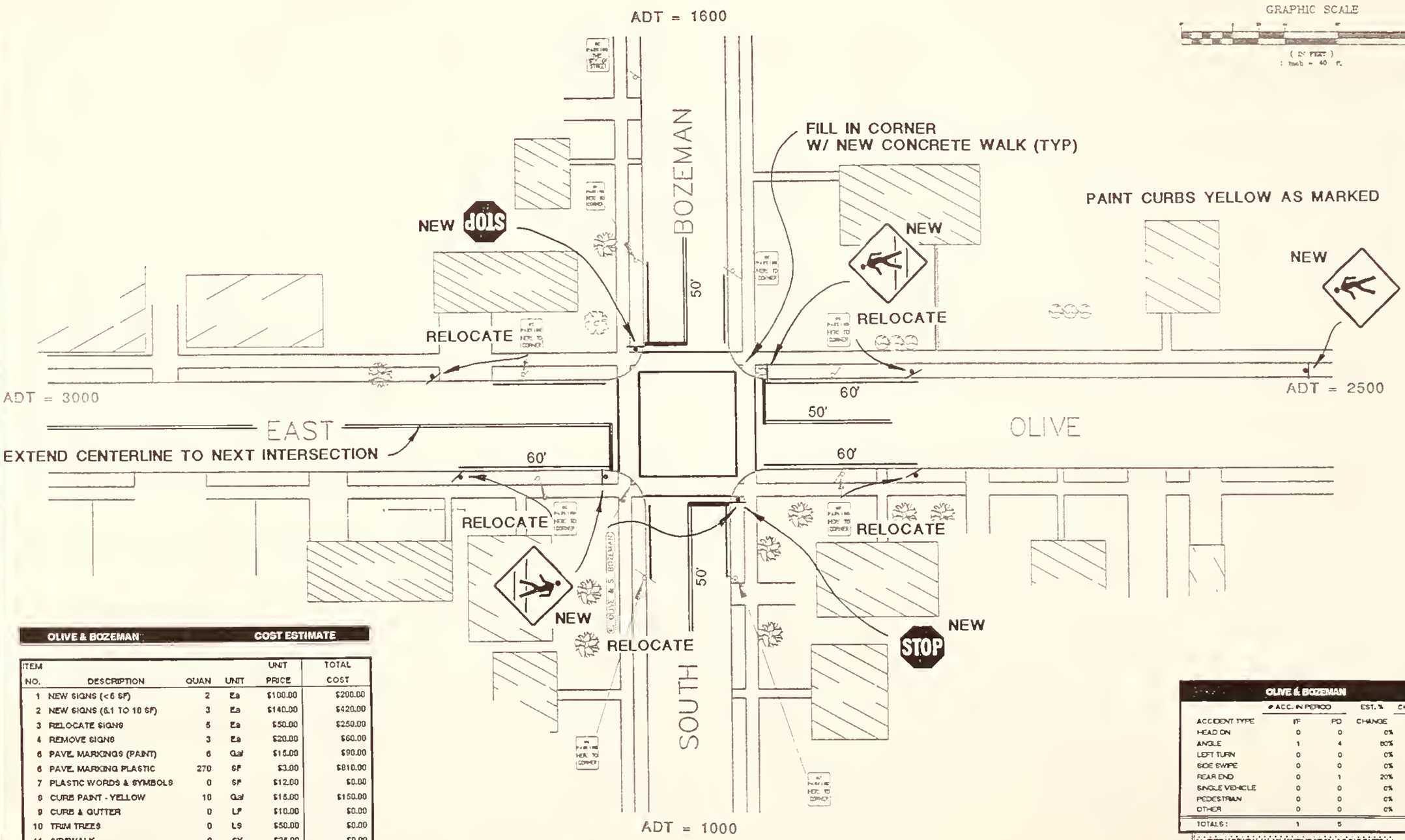
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers

1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & BOZEMAN

EXISTING CONDITIONS

SHEET 35



OLIVE & BOZEMAN COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	2	Ea	$100.00	$200.00
2	NEW SIGNS (6.1 TO 10 SF)	3	Ea	$140.00	$420.00
3	RELOCATE SIGNS	5	Ea	$50.00	$250.00
4	REMOVE SIGNS	3	Ea	$20.00	$60.00
5	PAVE. MARKINGS (PAINT)	6	Gal	$15.00	$90.00
6	PAVE. MARKING PLASTIC	270	SF	$3.00	$810.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	10	Gal	$16.00	$160.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	0	LS	$50.00	$0.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$1,980.00

OLIVE & BOZEMAN

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	I/F	PD		I/F	PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	4	60%	0.6	2.4
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	1	20%	0.0	0.2
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	1	5		0.0	2.6

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

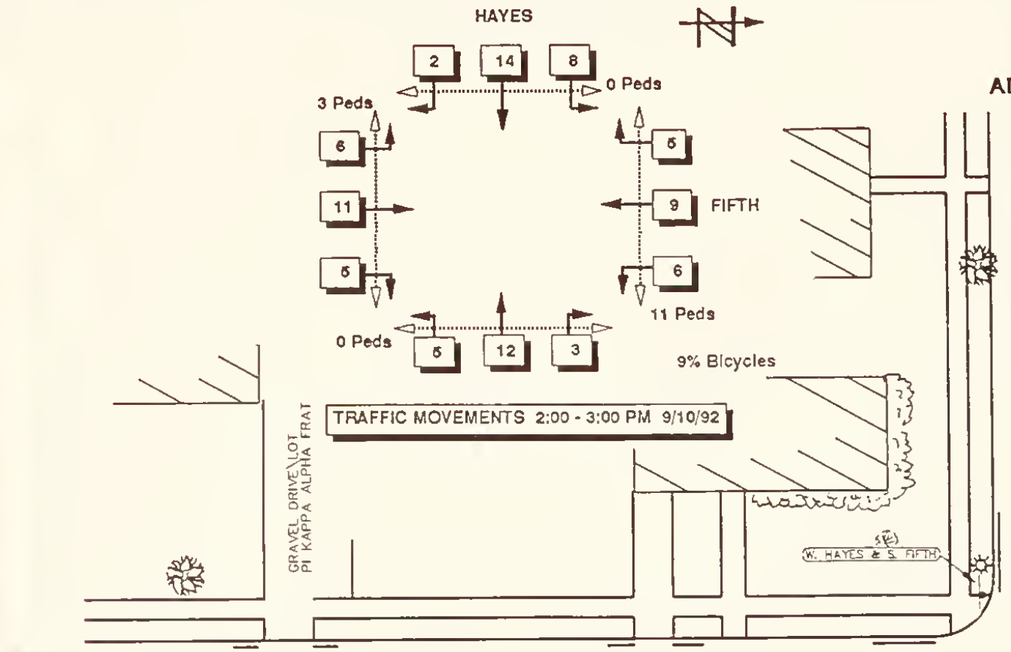
% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 52.0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

OLIVE & BOZEMAN

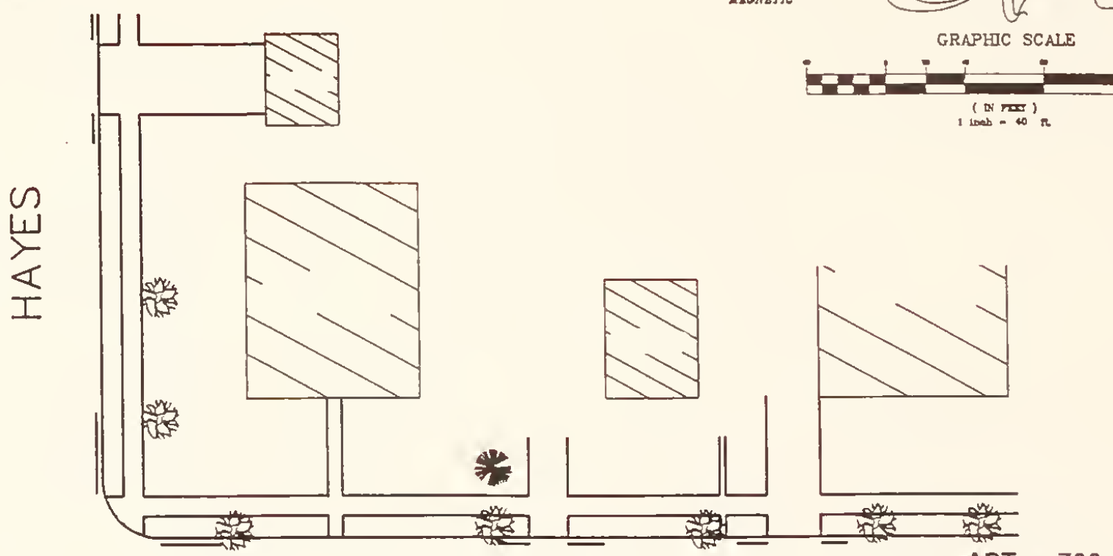
SHORT TERM IMPROVEMENTS

SHEET 36

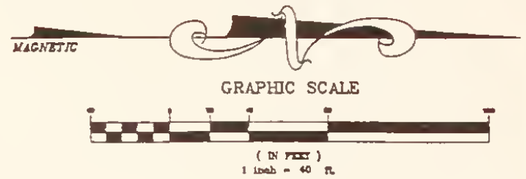


ADT = 500

ADT = 700

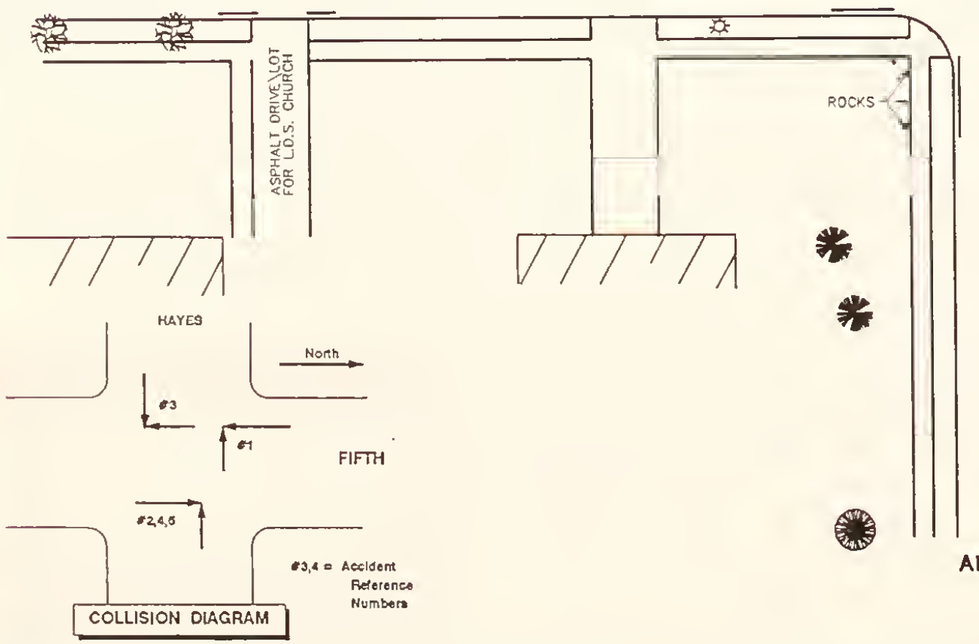


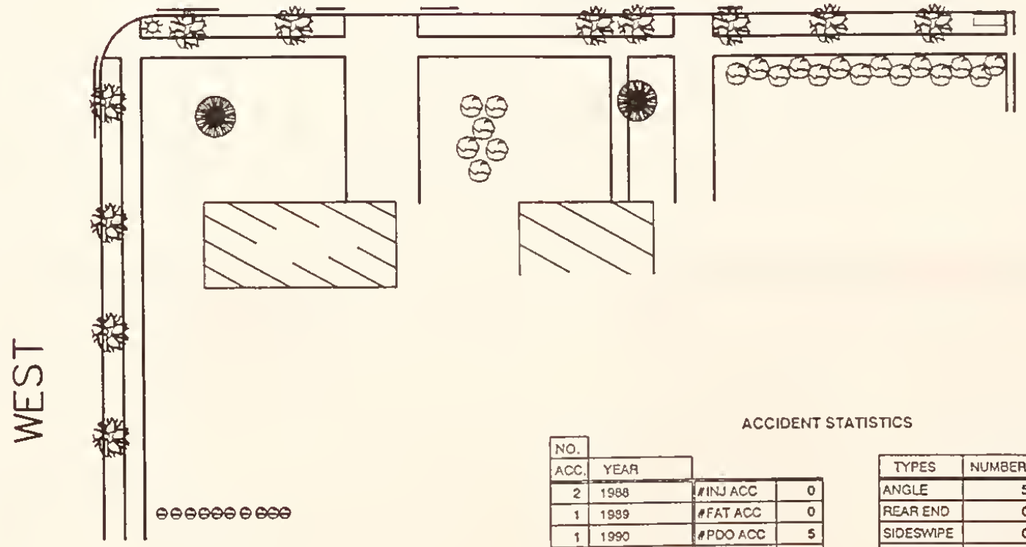
ADT = 700



SOUTH

FIFTH





ADT = 900

ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	0
1	1989	#FAT ACC	0
1	1990	#PDO ACC	5
1	1991	PERSON =	0 *
5	TOTAL	NIGHTIME	0%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	5	DRY	80%
REAR END	0	WET	0%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	20%
OTHER	0	OTHER	0%

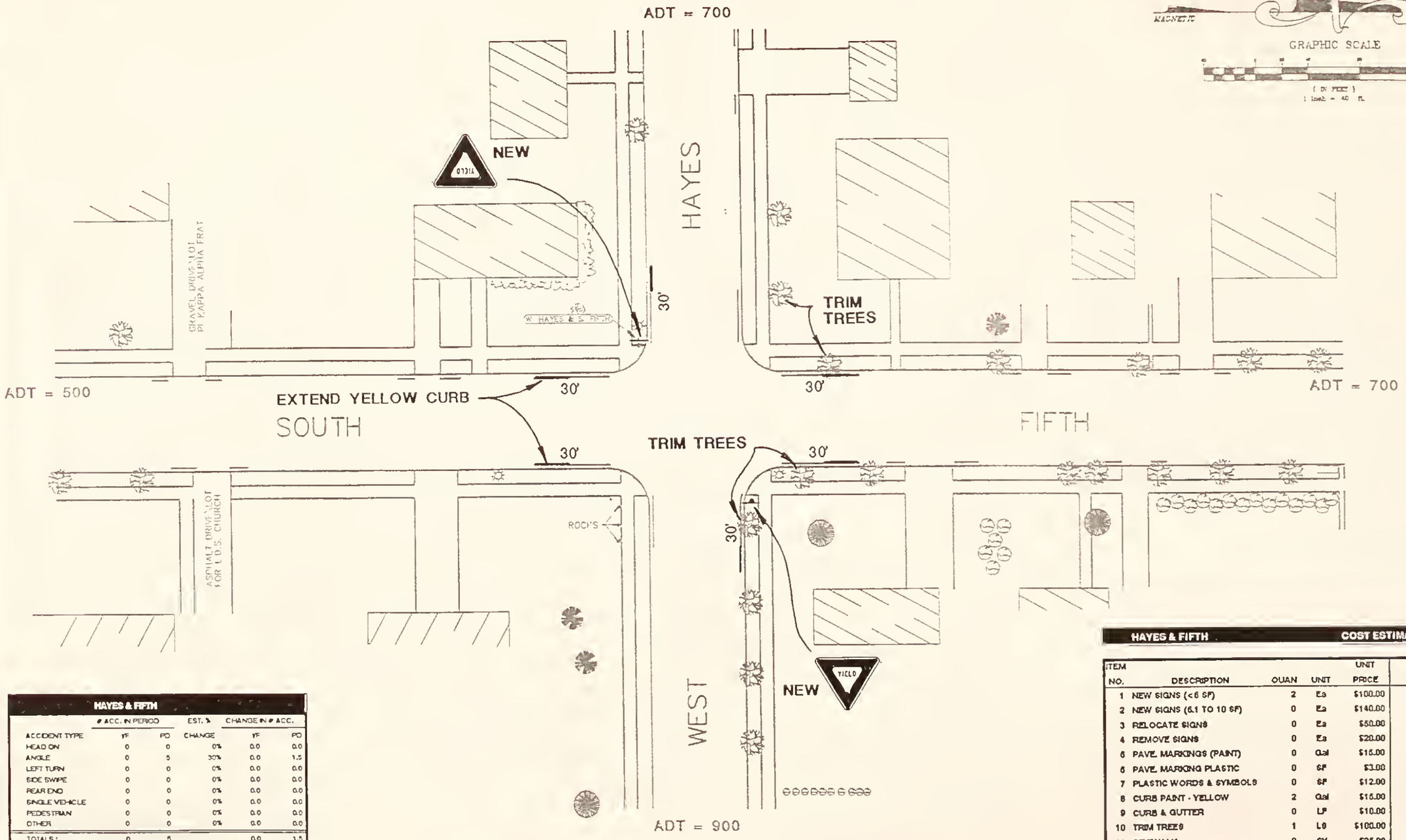
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers

1127 Alderson Ave. #204
Billings, MT 59102

HAYES & FIFTH

EXISTING CONDITIONS

SHEET 37



GRAPHIC SCALE

HAYES & FIFTH

ACCIDENT TYPE	# ACC. IN PERIOD		EST. % CHANGE	CHANGE IN # ACC.	
	I/F	P/D		I/F	P/D
HEAD ON	0	0	0%	0.0	0.0
ANGLE	0	5	30%	0.0	1.5
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS :	0	5		0.0	1.5

% REDUCTION IN INJURY/FATAL ACCIDENTS = ERR

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 30.0%

HAYES & FIFTH — COST ESTIMATE

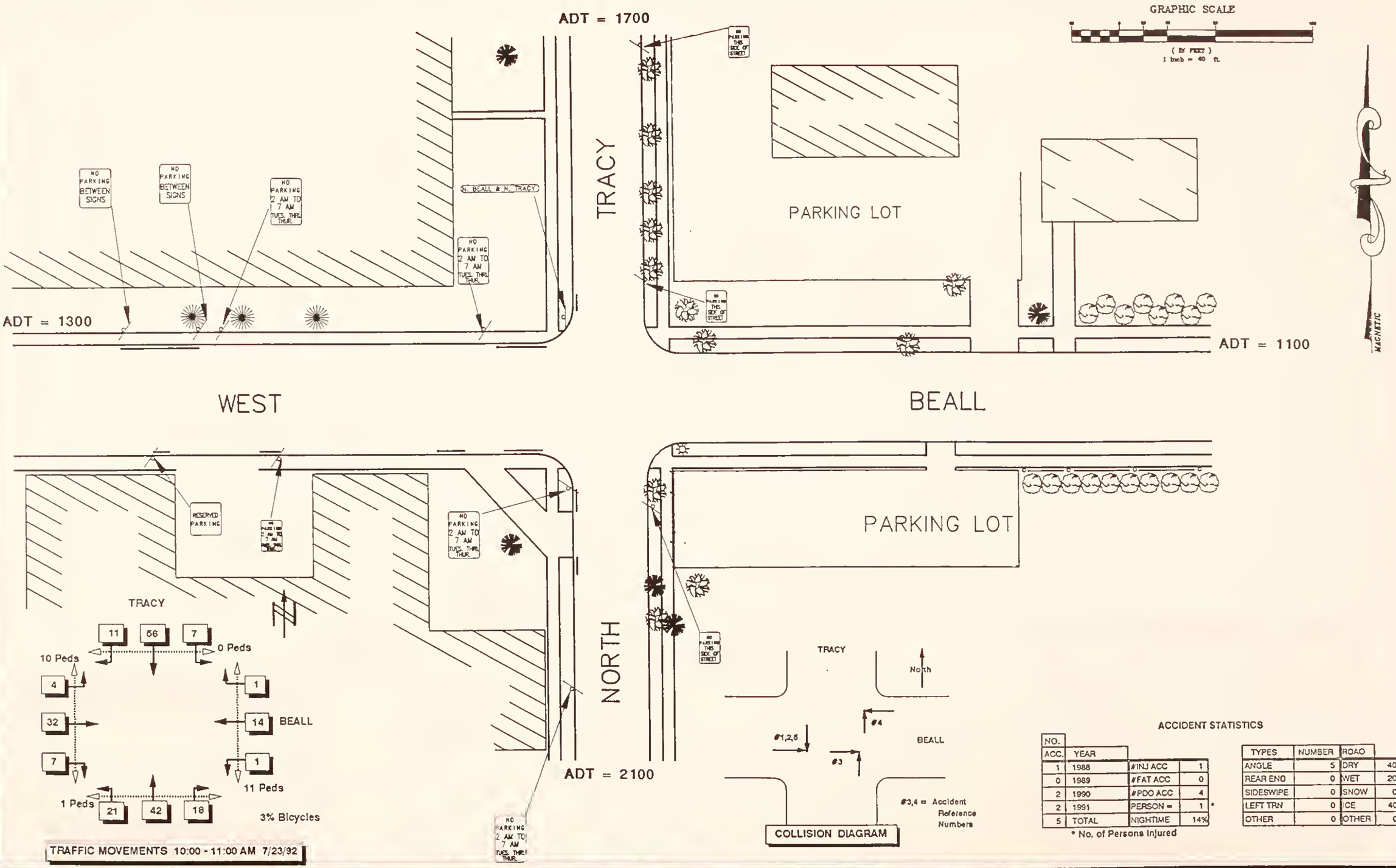
ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	2	Ea	$100.00	$200.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	0	Gal	$15.00	$0.00
6	PAVE. MARKING PLASTIC	0	SF	$3.00	$0.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	2	Gal	$15.00	$30.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$100.00	$100.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$330.00

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

HAYES & FIFTH

SHORT TERM IMPROVEMENTS

SHEET 38



ACCIDENT STATISTICS

NO. ACC.	YEAR		
1	1988	#INJ ACC	1
0	1989	#FAT ACC	0
2	1990	#PDO ACC	4
2	1991	PERSON =	1 *
5	TOTAL	NIGHTIME	14%

* No. of Persons Injured

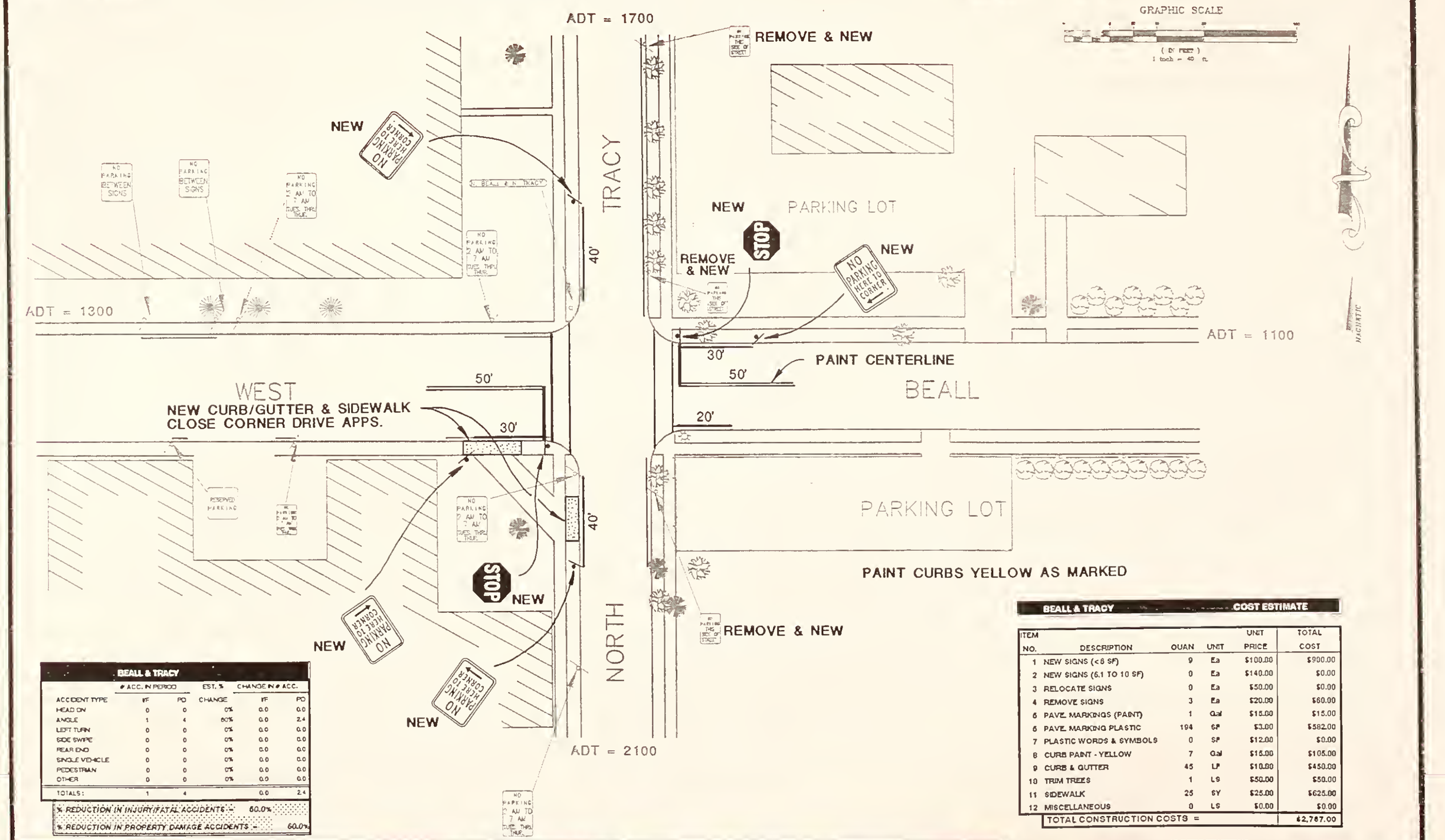
TYPES	NUMBER	ROAD	
ANGLE	5	DRY	40%
REAR END	0	WET	20%
SIDESWIPE	0	SNOW	0%
LEFT TRN	0	ICE	40%
OTHER	0	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

BEALL & TRACY

EXISTING CONDITIONS

SHEET 39



BEALL & TRACY

ACCIDENT TYPE	# ACC. IN PERIOD WF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. WF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	1	4	60%	0.6	2.4
LEFT TURN	0	0	0%	0.0	0.0
SIDE SWIPE	0	0	0%	0.0	0.0
REAR END	0	0	0%	0.0	0.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	0	0	0%	0.0	0.0
OTHER	0	0	0%	0.0	0.0
TOTALS:	1	4		0.6	2.4

% REDUCTION IN INJURY/FATAL ACCIDENTS = 60.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 60.0%

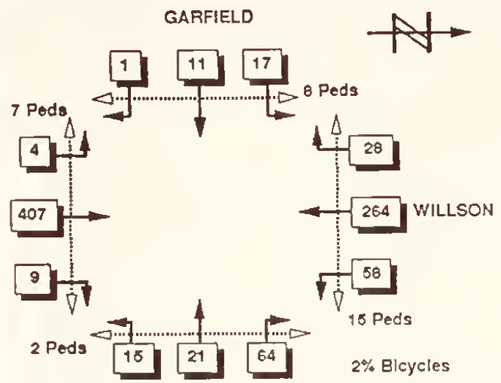
BEALL & TRACY — COST ESTIMATE

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	9	Ea	$100.00	$900.00
2	NEW SIGNS (6.1 TO 10 SF)	0	Ea	$140.00	$0.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	3	Ea	$20.00	$60.00
5	PAVE. MARKINGS (PAINT)	1	Gal	$15.00	$15.00
6	PAVE. MARKING PLASTIC	194	SF	$3.00	$582.00
7	PLASTIC WORDS & SYMBOLS	0	SF	$12.00	$0.00
8	CURB PAINT - YELLOW	7	Gal	$15.00	$105.00
9	CURB & GUTTER	45	LF	$10.00	$450.00
10	TRIM TREES	1	LS	$50.00	$50.00
11	SIDEWALK	25	SY	$25.00	$625.00
12	MISCELLANEOUS	0	LS	$0.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$2,787.00

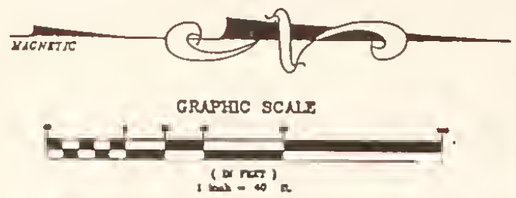
MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

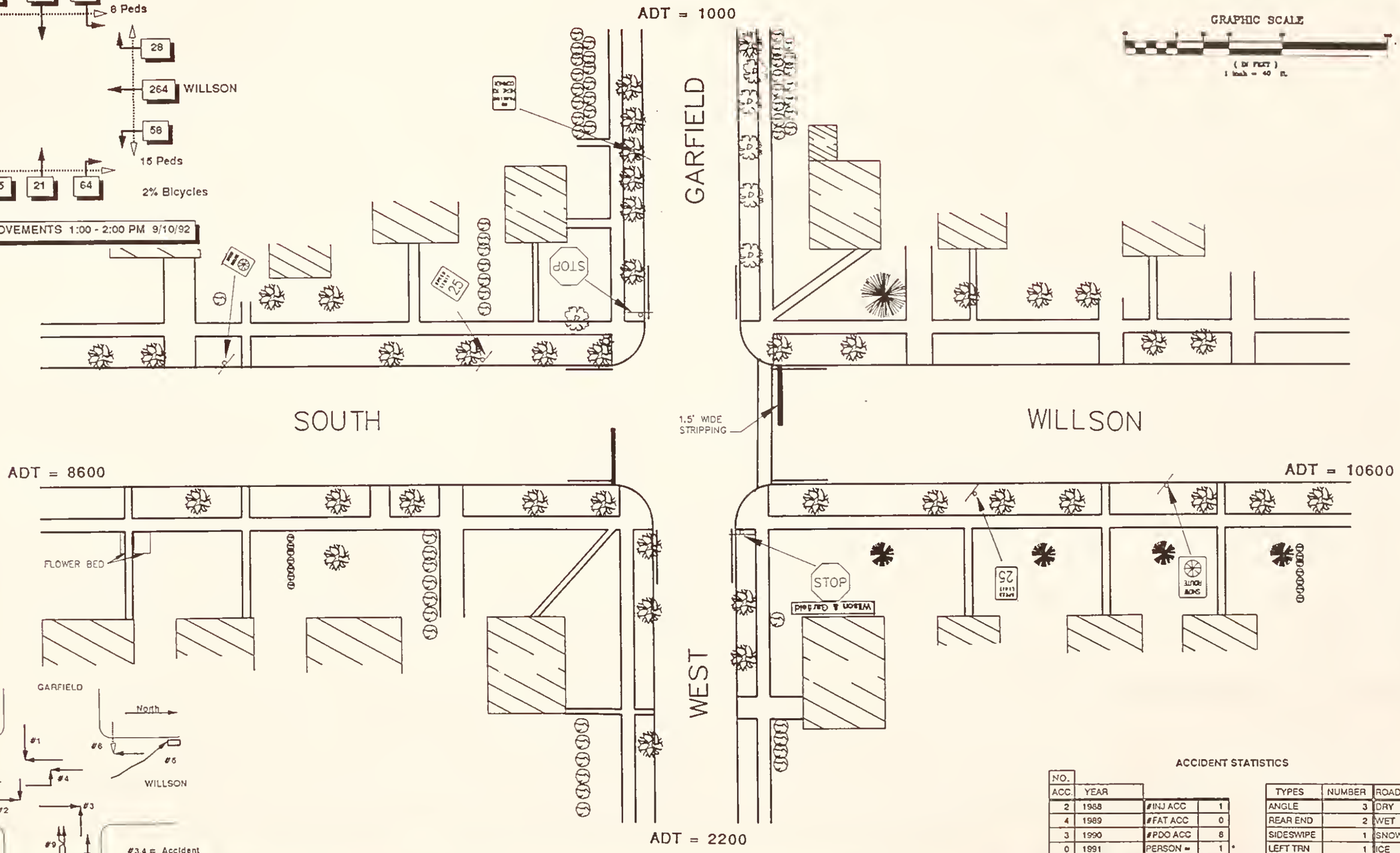
BEALL & TRACY

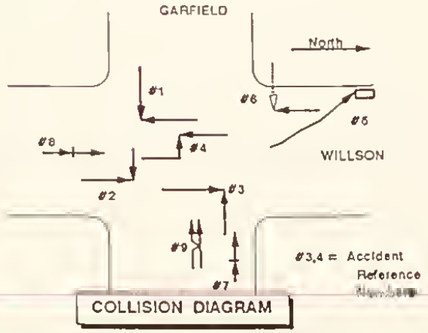
SHORT TERM IMPROVEMENTS



TRAFFIC MOVEMENTS 1:00 - 2:00 PM 9/10/92







COLLISION DIAGRAM

ACCIDENT STATISTICS

NO. ACC.	YEAR		
2	1988	#INJ ACC	1
4	1989	#FAT ACC	0
3	1990	#PDO ACC	8
0	1991	PERSON =	1 *
9	TOTAL	NIGHTIME	11%

* No. of Persons Injured

TYPES	NUMBER	ROAD	
ANGLE	3	DRY	33%
REAR END	2	WET	11%
SIDESWIPE	1	SNOW	11%
LEFT TRN	1	ICE	44%
OTHER	2	OTHER	0%

MARVIN & ASSOCIATES
Traffic, Transportation & Civil Engineers
1127 Alderson Ave. #204
Billings, MT 59102

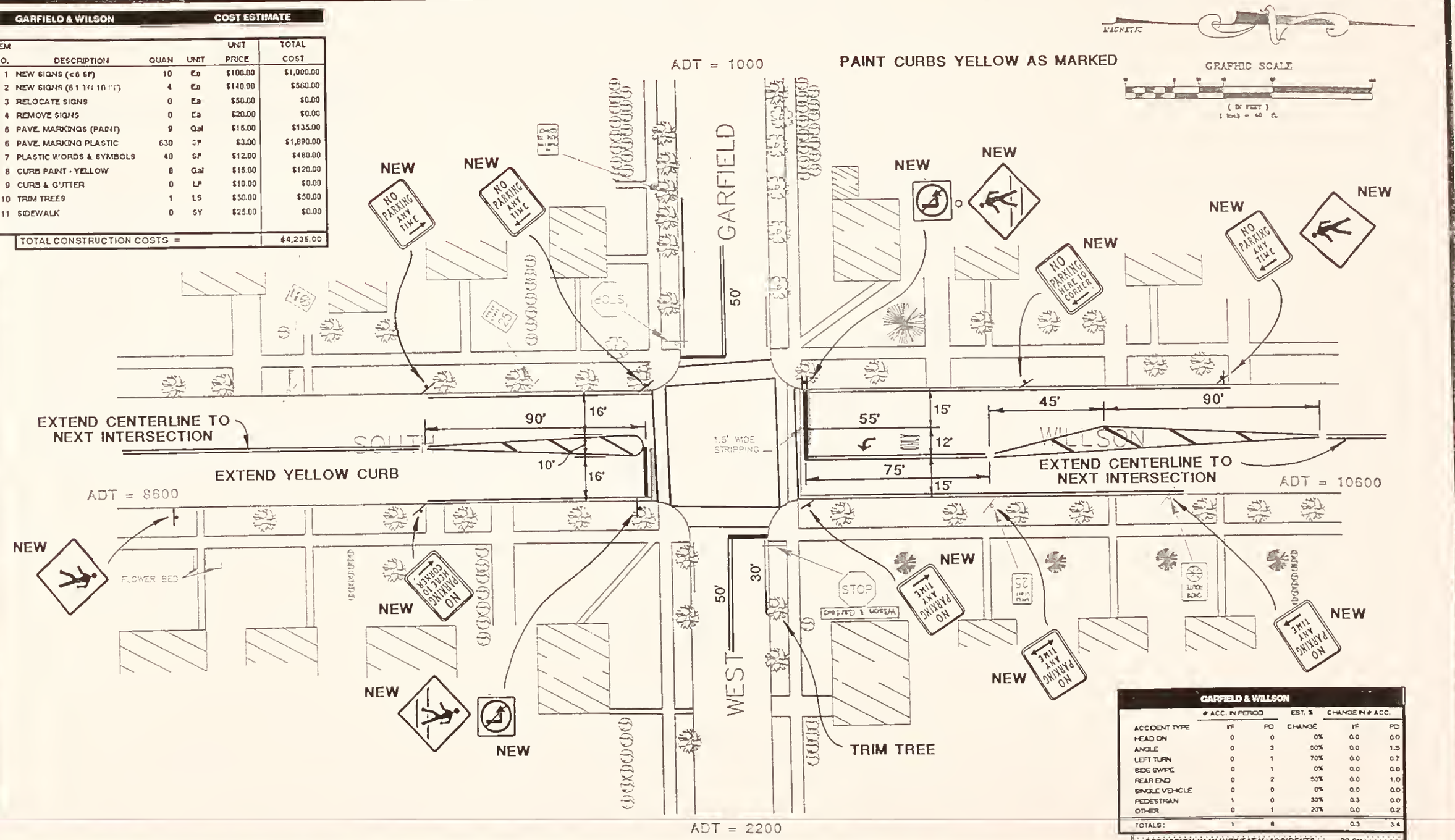
GARFIELD & WILLSON

EXISTING CONDITIONS

SHEET 41

GARFIELD & WILSON — **COST ESTIMATE**

ITEM NO.	DESCRIPTION	QUAN	UNIT	UNIT PRICE	TOTAL COST
1	NEW SIGNS (<6 SF)	10	Ea	$100.00	$1,000.00
2	NEW SIGNS (6 1 TO 10 SF)	4	Ea	$140.00	$560.00
3	RELOCATE SIGNS	0	Ea	$50.00	$0.00
4	REMOVE SIGNS	0	Ea	$20.00	$0.00
5	PAVE. MARKINGS (PAINT)	9	Gal	$15.00	$135.00
6	PAVE. MARKING PLASTIC	630	SF	$3.00	$1,890.00
7	PLASTIC WORDS & SYMBOLS	40	SF	$12.00	$480.00
8	CURB PAINT - YELLOW	8	Gal	$15.00	$120.00
9	CURB & GUTTER	0	LF	$10.00	$0.00
10	TRIM TREES	1	LS	$50.00	$50.00
11	SIDEWALK	0	SY	$25.00	$0.00
	TOTAL CONSTRUCTION COSTS =				$4,235.00



GARFIELD & WILLSON

ACCIDENT TYPE	# ACC. IN PERIOD IF	# ACC. IN PERIOD PD	EST. % CHANGE	CHANGE IN # ACC. IF	CHANGE IN # ACC. PD
HEAD ON	0	0	0%	0.0	0.0
ANGLE	0	3	50%	0.0	1.5
LEFT TURN	0	1	70%	0.0	0.7
SIDE SWIPE	0	1	0%	0.0	0.0
REAR END	0	2	50%	0.0	1.0
SINGLE VEHICLE	0	0	0%	0.0	0.0
PEDESTRIAN	1	0	30%	0.3	0.0
OTHER	0	1	20%	0.0	0.2
TOTALS:	1	8		0.3	3.4

% REDUCTION IN INJURY/FATAL ACCIDENTS = 30.0%

% REDUCTION IN PROPERTY DAMAGE ACCIDENTS = 42.5%

MARVIN & ASSOCIATES
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1127 Alderson Ave. #204
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GARFIELD & WILLSON

SHORT TERM IMPROVEMENTS